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VOL. XV

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OPERATIVE TREATMENT OF JOINT TUBERCULOSIS*

MELVIN S. HENDERSON, M.D.

Rochester, Minnesota

TUBERCULOSIS of bones and joints in America is on the wane. This is fortunate, but it does not bring solace to the unfortunate person who is afflicted, and he stands before the medical profession as a challenge to find measures of relief.

Joints are composed of bone, cartilage, ligaments, and the true joint lining (synovia). Usually when tuberculosis involves any given joint both bone and synovia are affected. Involvement of the joint lining only, or of the shaft of the bone only is rare. Tuberculosis of a joint is always preceded by the presence of the disease elsewhere in the body. The usual channel of entry for the bacillus is either the air passages, and so into the nodes at the base of the lung, or the intestinal tract, and thence into the nodes of the abdominal cavity. From these nodes the bacilli enter the blood stream, and are deposited in the skeletal structures and in the joints. In reality, therefore, we are dealing with a systemic disease, and regardless of whether conservative or operative treatment is to be accorded the affected joint, constitutional treatment is of primary importance. Perhaps the greatest danger of operative treatment of tuberculous joints is that all the attention may be focused on the joint, and the general and hygienic measures so essential to treatment may be neglected.

Tuberculosis of bone has been recognized and treated for many years, and it would seem that the results obtained and recorded in large institutions and in organized clinics would be available as definite guide posts, by which treatment could be directed. One can picture the dilemma of succeeding generations of young physicians

and surgeons who assume the difficulties of treating such patients. When these surgeons visit such a center as Leysin, Switzerland, where Rollier carries on his treatment, they find him using only conservative measures, and when they visit the clinic conducted by Hibbs at the New York Orthopedic Hospital, they find a diametrically opposite stand, since he advocates operative treatment. After all, the results obtained should control the type of treatment, and out of the haze of conflicting views certain facts are gradually accumulating for the guidance of future generations. A famous man's personality and the glamour surrounding him may cause the over valuation of certain methods advocated by him, but trial by others is the acid test.

The treatment of tuberculosis of the joint may be classified under two headings: conservative and surgical. I shall speak today of the operative treatment, but before I embark on any consideration of the subject I wish to make it clear that my remarks will be confined to tuberculous joints of the adult. I am aware that there is a tendency to advance the line of operative attack to include the diseased joints of children, and although because of frequent disappointment in the conservative treatment for children, I am fundamentally in sympathy with this trend, there are many factors to be considered. The child's time is not so valuable as that of the adult, he has no responsibilities, and often, in healthful and happy surroundings, overcomes the disease. Institutions are readily available for the child, in which he may stay indefinitely, whereas this is not true of the adult. My experience has been chiefly with the adult. My comparative inexperience with the disease in children and lack of records of sufficient end-results with children on

*From the Section on Orthopedic Surgery, The Mayo Clinic, Rochester, Minn. Read before the Mississippi Valley Conference, St. Paul, Minnesota, September 21 to 23, 1931.

which to base my opinion lead me to be unwilling to take any definite stand. At The Mayo Clinic the majority of children are treated by conservative measures.

I firmly believe, that taken by and large, the end-results in the adult, following even carefully controlled and protracted conservative or non-operative treatment of tuberculosis of joints, have been poor. In America people are loath, even if the opportunity is available, to submit to prolonged recumbency, heliotherapy and so forth. They become discouraged, accept their braces as necessary evils, and get along as best they can. For many years we have seen, in The Mayo Clinic, numbers of adults with tuberculosis of the joints who have been wearing braces and appliances for long periods with no appreciable curative results. I do not intend to convey the idea that adult patients never get well under conservative measures, for I believe they occasionally do. If, after years of conservative treatment, a tuberculous joint will become ankylosed, it is looked on as a triumph for conservative measures. If the same can be accomplished in as many months through operative measures, why waste all the time? Operative measures either should eradicate the disease entirely, or as nearly as possible. It should also induce ankylosis, with the minimal risk to the patient of death or dissemination of the tuberculosis. The chances of success will vary with the patient and with different joints. The structure of the joint and its contiguous structures have a bearing on the outcome. It is manifest that although a patient may have a tuberculous knee that should be resected, if he has active tuberculosis of the lungs and bilateral renal tuberculosis, operative measures are not indicated. It is also self evident that the same thorough resection and eradication of disease that can be carried out on the knee cannot be carried out on the spinal column, with the spinal cord coursing down the canal made by the very bones affected.

It is impossible to speak at any length of the methods best suited to the different joints. The upper extremity, since weight-bearing is not required of it, lends itself more readily to conservative treatment. However, the wrist and the elbow, and the ankle, for various reasons, are not readily treated by operation, and the percentage of cases of tuberculosis of the ankle that come to amputation is higher than that of any other

joint. The knee, spinal column, shoulder, and hip, in the order named, are suitable for operative procedures, and I shall briefly discuss the various types of operative measures that may be employed.

SELECTION OF THE PATIENT

Patients for operative treatment should be beyond the age of puberty, should be free of active pulmonary disease, should not have tuberculosis of the genito-urinary tract, and should be in good general health. A tuberculous kidney may have to be removed before the joint can be operated on, for the former is a vital organ, and if the disease is localized to one kidney, that organ should be removed before the opposite kidney is affected. Radical operations should not be done if draining sinuses are present. Exceptions may be made on these points only for very good reasons.

Each patient must have a thorough physical examination before radical surgical measures are instituted. Roentgenograms of the lungs should be made; also the urine should be subjected to tests, including microscopic examination, and if blood or pus is persistently present, cystoscopic examination should be made. The temperature should be noted and examination of blood made. In adults particularly, syphilis should be ruled out. It is only by such careful selection of patients that the mortality rate can be kept within legitimate limits. In the series of more than 600 cases in which operation has been performed at the clinic, the operative mortality rate is less than 1 per cent. A follow-up study over a term of years, of these same patients who recovered from the operation, shows that even in this selected group the mortality is high, 8 per cent in cases of tuberculosis of the knee, and 20 per cent in cases of tuberculosis of the spinal column. Dissemination of the tuberculosis is the cause of death in most cases, but the comfort derived from the result of the operation is well worth while. Most of the patients who died lived from four to eight or more years after the operation, and there is reason to believe that their lives were longer and their existence much more comfortable by virtue of having undergone operation than they otherwise would have been.

TYPES OF OPERATION

Aspiration and injection of various solutions.
—In the main, the results of aspiration followed

by injection have been sadly disappointing. The knee is the only joint anatomically suited for such treatment, and even here evidence has not been presented that warrants its continuance. However, aspiration or biopsy for the purpose of diagnosis by laboratory examination, and by inoculation of animals, is a definitely established and useful procedure.

Amputation.—Removal of an extremity should be resorted to only for definite reasons. If, for example, a patient has persistent draining sinuses from a knee, with so much destruction that the usefulness of the joint is hopelessly destroyed, or if pain is very severe and wearing, or if a patient already is burdened with tuberculosis in the lungs, kidneys or abdomen, amputation, although only a palliative measure, may be best. Economic conditions surrounding the patient may also be a big factor. Tuberculosis of the ankle often compels amputation, because of its prolonged course, and because of poor response either to conservative measures or to procedures intended to bring about ankylosis. Advanced destruction in the knee of an elderly person also usually is best treated by amputation.

Operations leading to ankylosis or fusion.—In the adult with tuberculosis of a joint the best thing that can happen is sufficient destruction of the cartilaginous surface to bring about bony union. Spontaneous recovery, with permanently good function, in the adult is so rare that it does not pay to wait for it. In some chronic cases sufficient comfort is secured through conservative measures to enable the patients to get along, but exacerbations are common, and they usually lead to the patient accepting an operation to produce ankylosis. Arthrodesis, or fusion, is particularly applicable to the knee and shoulder, although, with modern improved technic, the hip is fast becoming more amenable to this type of operation. The operation consists in exposing the diseased surfaces of the joints, removing all the affected cartilage and bone until healthy bone is thoroughly exposed, removing also all the synovia possible, and finally reshaping and fitting the

ends of the bone so that they may be held firmly together until union occurs. The finer points in technic vary, naturally, with different surgeons. In the spinal column, this type of radical operation cannot be done, but it is possible to fuse the posterior portions of the vertebræ, and to extend such fusion well above and below the affected vertebræ, by the plastic method of Hibbs or by the method of bone transplantation of Albee.

Experience with these types of operation in The Mayo Clinic has extended over many years, and the results justify adherence to the principle of radical operation, in selected cases, for tuberculous joints of adults. In 1927 we reported the results in 211 cases in which arthrodesis for tuberculosis of the knee was performed, and in 1928 I reported a series of 301 cases in which the fusion operation for tuberculosis of the spinal column was carried out. The results were good, all things considered, and many patients who had dragged themselves about for years, with the aid of crutches and braces, were enabled to discard these entirely and enter again a normal life. In a smaller series of cases in which the hip joint was involved, not as yet reported, the same proportion of satisfactory results was obtained. A painless, useful, stiff joint is preferable to a useless, more or less movable joint, and when the patient is given an explanation as to what he may expect from either conservative or operative methods, it is seldom that he fails to elect the latter.

SUMMARY

Conservative treatment has its greatest field of usefulness in treatment of children; operative treatment has its greatest field in treatment of adults. If the adult patient is in good general condition, and there are no draining sinuses, fusion should be produced when practical. The knee, spinal column, shoulder and hip are anatomically suited to a fusion operation. Each patient constitutes an individual study, and generalities, that may be true in the main may not be applicable to the individual.

OBSERVATIONS IN THE DIAGNOSIS OF GALLBLADDER DISEASE*

MAX H. HOFFMAN, M.D.
Saint Paul

GALLBLADDER disease is said to be the most common organic cause of organic digestive disturbances in the adult. It has been roughly calculated that over 20 per cent of all adults presenting symptoms referable to the digestive tract have pathology in this organ.¹ This figure is not difficult to believe, when we note that the statistics of several series of routine post-mortem examinations show that 4 to 10 per cent² of all cases have gallstones.

The diagnosis of cholelithic disease is often not easy. Atypical clinical pictures are very confusing to the clinician and frequently it is impossible to make a definite diagnosis. Since the introduction of the Graham-Cole method of visualizing the gallbladder, a renewed interest has been stimulated in an attempt to make an earlier diagnosis of cholelithic disease. This method of examination has proved itself to be a great aid to the diagnostician. Much has been claimed by certain writers for the value of Meltzer-Lyons method of studying the biliary fluid by means of a duodenal tube. Many who have given this test a fair trial feel that its value can be seriously questioned.

This study represents an analyses of 155 cases that presented evidence of a sufficient degree to warrant gallbladder removal. An attempt was made to determine the accuracy of the diagnosis and the reliability of various diagnostic procedures, such as X-ray and physical examination, and symptomatology. All the patients in this group were operated upon by Dr. Arnold Schwizer, and the pathological notes were taken from his operative descriptions and the laboratory reports.

The gallbladder was said to be diseased if any of the following observations were made:

1. Thickening of the wall or changes in color or texture indicating fibrosis.
2. Stones in the gallbladder or in the cystic duct.

3. Changes in the mucosa indicating inflammation or cholesterin deposits.

4. Thickening of the gallbladder bed with changes in the adjacent liver tissue.

5. Round cell infiltration in the gallbladder wall.

6. Positive cultures in the bile or gallbladder wall.

This is, of course, a classification devised for this study, and in no sense is it to be construed as the final word in classifying diseased gallbladders. It is often difficult to say just when a gallbladder is pathological. Does a positive culture with a normal histological structure indicate disease?³ Is thickening of the region around the opening of the cystic duct, with the remainder of the gallbladder normal, an indication of pathology?

One hundred and seventeen of the patients operated upon had stones in the gallbladder or in the cystic duct. This is 76.5 per cent of all the cases. One had a carcinomatous gallbladder, two had benign tumors, and three empyema. The remainder, diagnosed as being pathological, had one or more of the findings listed above. Eleven cases (7 per cent) were called normal or questionable. For purposes of discussion, we will separate the pathological cases from the group that showed no pathology at the operation.

SYMPTOMATOLOGY

Without question the most important single diagnostic procedure is the securing of a careful history dating back to the first appearance of digestive disturbances or pain. The patient often needs considerable prodding in order to remember the mild pains and digestive upsets that occurred a number of years before. Complete freedom from distress of any kind may be present for years after the initial attack.

The symptomatology of gallbladder disease has its origin either in the over-distended gallbladder itself or by reflex or direct action of the diseased gallbladder on the adjacent organs, notably the

*Thesis presented before the Minnesota Academy of Medicine, October 14, 1931.

stomach, pancreas, and intestinal tract. Alvarez⁴ "reverse peristalsis syndrome" plays a very prominent part in the production of the discomfort.

Pain.—Pain is the outstanding symptom that brings the patient to the physician. Although it appears that severe pain is a late development in the course of the disease, the earlier digestive symptoms are often not sufficiently severe to cause the patient to seek relief. Several of our group gave a history of having had the first attack twenty-five to thirty years before coming to the office, the intervening period having been free from any severe pains. Many gave a history of periods lasting several years between attacks that were free from symptoms. The intensity varied from slight pains bordering on discomfort to very severe colicky attacks that required large doses of morphine for relief.

Most of the patients complained of pain in the upper abdomen. In our group, six patients had no pain at all. Sixty-one patients (40 per cent) complained of pain in the upper right abdomen, below the costal margins, and radiating around to the back. All of these individuals had pain occurring in attacks. This, of course, is the most typical type of gallbladder pain and corresponds to the textbook description of pain occurring in an attack of gallbladder colic. Forty-three had pain located in and to the right of the epigastrium that did not radiate to the back. In many of these the pain also came on in attacks, but much less frequently than in the group in which the pain was in the right hypochondrium.

It was noted that frequently in the early attacks, the pains were limited to the epigastrium, and in the later attacks it shifted to the right hypochondrium and back. In one patient it was limited to the right shoulder, in one to the interscapular region, and in five the pain was in the lower right abdomen. The remainder of the patients had pain mostly in the right abdomen, or across the abdomen, but not well localized. The frequent association of gallbladder disease with appendicitis and duodenal ulcer must be borne in mind. In our group we had no cases in which the pain was limited to the left side of the abdomen.⁵ This type of pain has been described and is explained either as referred pain or pain due to the spasm of the pylorus that so frequently occurs in gallbladder disease.

It is well known that attacks of pain occurring

at night and awakening the individual from sleep are frequently a part of the history of those who suffer from duodenal ulcer. In fact it occurs so frequently that it is considered almost pathognomonic of this disease. For a number of years Dr. Arnold Schwyzer has emphasized the importance of night pains, occurring in gallbladder disease, especially those pains occurring after 2 A. M. There has been an attempt to explain this phenomenon as being the result of small stones floating into the cystic duct when the patient assumes a horizontal position. We found that one-third of our patients had night pains of the type described above. Many of them, however, occurred before 2 A. M. We also found that it occurred just about as frequently in those who had cholecystitis without stones as in those patients who had stones.

It would seem that night pains could be much better explained by the failure of the diseased gallbladder to empty properly at night when the stimulus for emptying, *i.e.*, gastric contraction and food ingestion is withdrawn. The gallbladder, in failing to empty, becomes over-distended and causes pain.

Dyspepsia.—Dr. Alvarez⁴ has called attention to a group of symptoms that he has termed "the reverse peristalsis syndrome." These symptoms are nausea, vomiting, belching, bloating and pyrosis. Although they are present in many states causing digestive disturbances, including that large group termed functional indigestion, he believes this syndrome is often an early finding in cholecytic dysfunction. In our group, six patients had no definite history of pain, but presented one or more of the above complaints.

Nausea and vomiting were present in slightly over one-third of the cases, but in the great majority only during an attack, and it was usually accompanied by bloating and belching. It was rather surprising to find that relatively few patients carried the digestive disturbances through the periods between the attacks. Those that had trouble during this period were bothered mostly with bloating and belching. Nausea and vomiting were conspicuously absent.

We were unable to find that there was any particular food that uniformly caused these patients distress. Fats are said to be eaten with difficulty, but in our group there was no good evidence for this statement. Nor were we able to find that any particular food, or foods in general were capable

of producing an attack. The patient is always searching for a cause, and usually ascribes it to something that was eaten in the previous meal.

Physical Findings.—The only physical findings that seem to be of any importance are tenderness, palpation of the enlarged gall bladder, and jaundice. Of these, tenderness is by far the most frequent and most important sign. It was present in about half (78) the cases of our group, usually during and for a short time after the attack. In seventy-four of these cases it was in the upper right abdomen. In four cases it was across the upper abdomen. About half of the group had no history of ever having had any tenderness. Two patients had muscular resistance without soreness. When present, it is an extremely valuable finding, but its absence should not mislead the clinician in his search for gallbladder disease. When ordinary palpation fails, tenderness can often be elicited by having the patient sit up and lean forward; then, with the physician behind, the examining fingers can be pressed deeply under the ribs.

The gallbladder was palpated in only three patients, two having empyema and one carcinoma. Some writers⁶ claim to be able to feel the gallbladder in a large percentage of their cases. It would seem, however, that the location of this organ, together with the softness of the tissues around it, would make it very difficult to palpate. When it is palpable, it always means that a pathological condition is present.

It is generally believed that jaundice is a frequent occurrence in gallbladder disease. Only eleven patients (less than 8 per cent) had jaundice at one time or the other. In three cases it was questionable. No routine examination was made to determine the presence of bilirubinemia.

CHOLECYSTOGRAPHY

The Cole-Graham method of examining the gallbladder by means of a dye and X-ray has superseded the older indirect X-ray examinations. This method is far from infallible, and its accuracy depends a great deal upon the experience of the interpreter and the technic used.

There are also sources of error that cannot be controlled. If we recall that the appearance of the dye in the gallbladder depends upon its first being absorbed from the intestinal tract and then excreted by the liver, we can understand that the concentration of the dye does not always repre-

sent the functional state of the gallbladder. For that reason we cannot accept the lessened intensity of the shadow as always indicating disease when the oral method is used.

However, in spite of the factors that affect the efficiency of this test, it is a valuable aid to the diagnostician, and taken together with the clinical picture, it has markedly increased the percentage of correct diagnoses. It should be borne in mind that a failure of the dye to appear does not always mean gallbladder disease. Nor does a normal shadow always signify a normal gallbladder.

Cholecystographic studies were made in 122 cases by the oral method. A diagnosis of pathological gallbladder was made in ninety-eight and fourteen were called normal. In the group diagnosed as being pathological, the percentage of correct diagnoses according to the cholecystographic criteria of pathology was as follows:

- | | |
|--|--|
| 1. Nonvisualization of the gall bladder shadow. | |
| 40 cases. 29 showed stones, 10 had other definite pathology, and one was normal. | |

Percentage of correct diagnoses..... 97.5%

- | | |
|--|--|
| 2. Diagnosis of stones, i.e., stones visualized. | |
| 40 cases. 38 showed stones, one had other pathology, one was normal. | |

Percentage of correct diagnoses..... 95%

- | | |
|---|--|
| 3. Faint visualization. 13 cases. 4 showed stones, 7 had definite pathology, and 2 were normal. | |
|---|--|

Percentage of correct diagnoses..... 85%

- | | |
|--------------------------------------|--|
| 4. Irregular filling. 5 cases. | |
| 4 were normal, one was pathological. | |

Percentage of correct diagnoses..... 20%

Of the group diagnosed as being pathological, according to the Graham-Cole test, eight were normal and ninety pathological at operation: a percentage of correct diagnoses of 92 per cent. The greatest number of errors occurred in the group where the gallbladder was called abnormal because of an irregular filling. In that group the diagnosis was correct in only one out of five cases. Obviously, then, an irregular shadow is a poor basis for making a diagnosis of pathology.

In the first group, where the diagnosis of pathology was based on the nonvisualization of the gallbladder shadow, we had a very high percentage of correct diagnoses, 97.5 per cent; a figure higher than the true value of this finding would warrant. On several occasions we have failed to secure a filling of the gall bladder on the first examination, and later a normal response was present when the examination was repeated.

A diagnosis of cholelithiasis can be made only if the stones are visualized. Usually there is not much difficulty in interpreting stone shadows. However, there are two sources of error that must be guarded against. The negative shadows cast by cholesterol stones may be simulated very closely by bubbles of gas in the bowel. Frequently these negative shadows are called stones, but a little experience will usually enable one to differentiate them correctly. Another source of error occurs in those cases of stones in which the gallbladder fills very well with the dye. The intense shadow of the dye obscures the shadows cast by the stones. As Kirklin has pointed out, if the gallbladder is only partly emptied by a fatty meal, the shadows of the stones will be seen; but if it completely empties, the stones will often be missed.

There were fourteen cases in which the X-ray report indicated a normal functioning gallbladder. Of this group, six were definitely pathological. Three had pericystic adhesions of a degree and character that were not considered to be normal. Five were normal. Only one gallbladder in this group contained stones. If we were to exclude the group with adhesions as being pathological there would still be an error in diagnosis of 43 per cent. It is a well known fact that a pathological gall bladder can often concentrate the dye very well, even when numerous stones are present.

COMMENT

Of the entire group of 155 patients operated upon, eleven were considered as having no demonstrable pathology in their gallbladders, giving a percentage of correct diagnoses slightly over 92 per cent. Of the 92 per cent that showed disease, 81 per cent consisted of stones. This figure indicates pretty well that we have selected for operation a group that would present rather definite symptoms. From the standpoint of conservative surgery, this selection is very good, but it probably also means that we are making a definite diagnosis of gallbladder disease in only those cases that present a more advanced picture. Mentzer, at the Mayo Clinic, in 1,647 consecutive autopsy examinations, found that 37 per cent of the patients had cholesteroses of the gallbladder and 20 per cent of these had stones. If this figure gives us a true indication of the incidence of cholelithiasis, we must either be missing a

large number of cases or must conclude that many of them do not ever produce symptoms, or possibly only in the late stages. It has been claimed that the early symptoms are those of digestive dysfunction; but we have been unable to find that these symptoms are in any way diagnostic: they merely make us suspect the presence of gallbladder disease. Some of our patients with advanced pathological changes had no digestive trouble except during and for a short time after an attack.

Pain is by far the most dependable finding, especially if it occurs in the upper right abdomen and at night after 2 A. M. In our group of pathological cases 34 per cent of the patients had night pains, whereas in the group of normal cases, only two patients, or 14 per cent, had similar pains.

The degree of pathology present and the intensity of the distress do not bear any definite relationship to each other. As a whole the patients with stones complain of more severe pain than those without stones. However, some with only a small amount of pathology had very severe symptoms while others with advanced changes had comparatively little.

Cholecystography is supposed to be a test of gallbladder function, and for that reason is considered by its discoverers to be especially valuable as a means of detecting early cases of gallbladder disease, where there are only slight pathological changes but considerable functional disturbance. If that were true, why do we so often find a good concentration of the dye with good emptying in the presence of stones and other disease? The answer to this question would indicate that stones may be present with a functionally intact gallbladder mucosa, and for a long time produce no symptoms. However, in spite of the deficiencies of this method, it has proved itself to be of inestimable value as a means of corroborating our clinical impression, and it often will make a definite diagnosis of gallbladder disease where it was not suspected. In the absence of pain, one hesitates to make a diagnosis unless the cholecystograms indicate that there is some disturbance of the function of the gallbladder.

We have attempted to study the group of eleven cases where no pathology was found at operation by means of the follow-up notes on their records, and by sending them a questionnaire. They were asked if they still had pain

and to locate and describe the character of the pain, the type of digestive trouble that was present, and whether or not they had achieved the relief that they had hoped for when they had consented to undergo an operation. Only seven questionnaires were returned. Of these, two were completely relieved of their symptoms. The gallbladder at operation in one of these cases was wrinkled and showed signs of recent distention with no other pathology. Another of this group who had a history of having had an operation for a duodenal ulcer, but who also had a positive Graham-Cole test, received no relief from the operation. The fourth case, before the operation complained of occasional diarrhea and abdominal pains. The pains were epigastric, occurred in attacks, and radiated to the shoulder blade. The Graham-Cole test showed an irregular shadow. At operation the gallbladder was normal. She stated in the questionnaire that the epigastric pain was gone, but the diarrhea and abdominal cramps were very severe. She did not think the operation helped her very much. Three of the seven patients who returned the questionnaire complained of diarrhea. It is not at all clear as to just what this means. It is well known that diarrhea fairly frequently accompanies cholecystitis and is explained by the decrease in the amount of acid secreted by the stomach. However, there does not appear to be any uniformity of opinion regarding the effect of gallbladder disease on gastric secretion, nor do we know a great deal about the effect of the gallbladder on the intestinal tract. The three other patients who returned the questionnaire did not obtain much relief.

Of the remaining four who failed to answer the questionnaire, the follow-up notes indicate that two had complete relief and two were not benefited. Three of the four had negative Graham-Cole tests; one was positive.

Of the eleven patients with a normal gallbladder, four had complete relief. Were these cases of functional gallbladder disorder, and is there such a thing as dyskinesia of the gallbladder? Dr. Boyden's work on the function of the gallbladder opens up a method of investigating this subject. It was also interesting to note that in this group of normal gallbladders there were a number of X-ray diagnoses of pathology, based on irregular filling, and one report of stones in which the shadow was cast by a gas bubble.

With the increased experience that we now have in interpreting cholecystograms, most of them would be called normal.

As a whole the symptoms and signs presented by the group with normal gallbladders did not differ greatly from those in the definitely diseased group.

On the basis of this study it is felt that there is no group of symptoms that are at all characteristic or pathognomonic for all cases of gallbladder disease. The diagnosis is made primarily on the clinical findings, the dye test usually serving to give additional evidence. In the absence of very definite symptoms or positive physical findings, the diagnosis of gallbladder disease is always uncertain, and even with a typical history and X-ray findings all pointing to a diseased gallbladder, the laboratory will occasionally report—no pathology.

SUMMARY

1. This study is an analysis of 155 patients who presented symptoms that warranted the removal of their gallbladders.
2. The diagnosis was correct in slightly over 90 per cent. Stones were found in 77 per cent of cases.
3. Pain was considered to be the most reliable symptom. Night pains occurred in 38 per cent of the pathological cases, and, in the absence of a definite peptic ulcer history, is thought to definitely indicate the presence of gallbladder disease.
4. Digestive symptoms, although suggestive of gallbladder disease, are not of great diagnostic value.
5. The Graham-Cole test is of unquestionable value if the gallbladder fails to fill or if stones are visualized. The other findings are not considered to be very reliable.
6. The eleven normal cases were studied and were found to have about the same symptoms as the pathological cases. Four were completely relieved of their symptoms by the removal of their gallbladders.

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AVERAGE OPTIMUM DOSAGE OF COD LIVER OIL

The Council on Pharmacy and Chemistry reports that at present the recommended dosages of cod liver oil differ widely. In part, the varying effects that have been reported may no doubt be explained by the unlike activity of different brands of cod liver oil. Thus, while the U. S. Pharmacopeia permits the claim that the product is biologically standardized if it contains 50 vitamin A units per gram as determined by the method given, certain brands now in New and Non-official Remedies guarantee a potency of 1,000 U. S. P. vitamin A units per gram, and none contains less than 500 units. The vitamin D potency of cod liver oil is probably still more uncertain, since no official method of assay has been adopted; hence it is most difficult to compare different brands of cod liver oil even if the vitamin D potency and method of assay are declared. In view of the foregoing situation, the Council referee in charge of cod liver oil and cod liver oil preparations believed that some effort should be made to ascertain the amount of cod liver oil that must be administered under ordinary conditions to obtain the effects attributable to cod liver oil. With a view to obtaining an expression in regard to the dosage of cod liver oil, an inquiry was formulated and sent to nineteen pediatricians. From the replies received it was noted that little reference is made to the possible physiologic value of the vitamin A of cod liver oil, and that

the consideration of dosage is expressed wholly in relation to the vitamin D content, or in terms of its effects in overcoming the relatively obvious physical manifestations of rickets. In all the opinions cited, the authors apparently recognize the added value of vitamin A and prescribe cod liver oil in preference to plain viosterol. Viosterol is favored, however, but only as a supplement, such as cod liver oil with viosterol 10 D. Most of the pediatricians quoted seem to agree on a dosage of 3 teaspoonfuls daily as amply sufficient to prevent and cure clinically evident rickets. In contrast to the practice of physicians in former years, most of the pediatricians begin the administration of cod liver oil at a time when the growth begins to accelerate—if not within two weeks, then at least before the end of the first month—reaching the maximum dosage usually during the third and rarely later than the fourth month, thus usually aborting the rickets in its earliest incipience and hence obviating the use of large doses later. There appears to be general agreement that it is only during these first two or three months of most rapid growth that the child requires its maximum dosage of cod liver oil, which may be continued as an ample dosage on up to 2 years of age. The Council has decided that a dosage of 3 teaspoonfuls (12 c.c.; 3 fluidrachms) daily, may tentatively be set as the standard optimum dosage of cod liver oil for the average infant, at 3 months of age. (*Jour. A. M. A.*, January 23, 1932, p. 316.)

DIAGNOSIS AND MANAGEMENT OF CORONARY ARTERIAL DISEASE*

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WILLIAM HARVEY,¹ in one of his letters written in 1653, appears to have given the first definite account of a clinical picture associated with diseased coronary vessels demonstrated at autopsy. The following is quoted from Harvey's description: "I will add another observation, a noble Knight Baronet Sir Robert Darcie, about the middle of his age, did often complain of an oppressive pain in his breast, especially in the night time, sometimes fearing suffocation by a Paroxysme, he lead an unquiet and anxious life, using the Counsel of all Physicians, and taking many things in vain, at last the disease prevailing, he becomes cachectic and hydropick, and at last opprest in a signal-paroxysm he died. In his Corps, in the presence of Dr. Argent, who at that time was President of the College of Physicians, and Dr. George, a rare divine, and a good Preacher, by the hindrance of the passage of the blood out of the left ventricle into the arteries, the wall of the left ventricle itself (which is seen to be thick and strong enough) was broken, and poured forth blood at a wide hole, for it was a hole so big that it could easily receive one of my fingers."

In 1768, Heberden² published his masterly description of a clinical picture to which he gave the name angina pectoris. Shortly after this, Jenner and Parry ascribed this condition to changes in the coronary vessels. An extensive literature developed, most of which consisted of attempts either to prove or disprove the relationship between coronary disease and angina pectoris. Thus Huchard³ claimed that angina pectoris and coronary disease were practically synonymous, while Albutt⁴ did not consider coronary sclerosis of any clinical significance, as the following statement indicates: "It is freely admitted that coronary disease may and for the most part does pursue its silent way without anginous or other storms." This uncertainty as to the clinical aspect of coronary sclerosis is shown

by the fact that in most of the modern textbooks and systems of medicine there is no attempt to discuss coronary disease as a clinical entity. We have thus a common pathological condition which has been recognized for several hundred years, but which, apparently, still has no clearly understood and generally accepted clinical picture.

In order to study the clinical features of this condition an analysis was made of 113 cases from the Department of Pathology of the University of Minnesota.⁵ All those included showed severe coronary disease with marked narrowing and partial obliteration of one or more large arteries, and usually definite fibrosis or softening of the myocardium. The clinical features discussed in the present report are derived from an analysis of the clinical data of this series of autopsies with the additional details obtained from observation of a group of clinical cases over a period of five years.

Age and Sex.—The average age at the time of death in the autopsied group was fifty-nine and two-fifths years. The youngest was thirty-two, and the oldest eighty-eight years. The age distribution is shown in the accompanying table (Table 1).

TABLE 1.—AGE AT THE TIME OF DEATH OF 110 CASES OF CORONARY DISEASE

Age	No. of Cases
30 to 39.....	2
40 to 49.....	17
50 to 59.....	28
60 to 69.....	45
70 to 79.....	15
80 to 89.....	3

There was a definite preponderance of males, the ratio of males to females being three to one.

Types of Clinical Picture.—The outstanding clinical feature was the tendency for the symptoms to occur in attacks. This was true in about 60 per cent, while in the remainder the symptoms were those of progressive heart failure, and

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acute paroxysms were not prominent. The attacks consisted of an oppressive pain in the chest in 75 per cent, and were localized to the abdomen in 25 per cent. Attacks of acute respiratory distress were present in about 10 per cent of the cases. On further analysis it was found that the clinical picture differed in two important respects: (1) as to size of the heart; and (2) as to presence or absence of congestive heart failure. Thus the heart was within normal limits as to size in 39.9 per cent and was enlarged in 60.1 per cent. Congestive heart failure, judged by clinical signs and postmortem findings, was present in 40.6 per cent and absent in 59.3 per cent.

From the standpoint of symptomatology the study of this autopsy material indicated that there were two distinct types of coronary disease: (1) a group in which the symptoms consisted of attacks of pain or acute respiratory distress, without evidence of congestive heart failure; and (2) a group in which the outstanding symptoms were those of congestive heart failure, dyspnea, cough and edema (Table 2).

TABLE 2.—TYPES OF CORONARY SCLEROSIS (113 AUTOPSIES)

	Per cent
Anginal Syndrome, liver congestion absent at autopsy	59
1. Heart normal in size	37
2. Heart enlarged	22
Congestive Heart Failure, liver congestion present at autopsy	41
1. Heart normal in size	2
2. Heart enlarged	39

Diagnosis.—The diagnosis of coronary disease with congestive heart failure will not be considered in this discussion. This type is intimately associated with hypertension heart and presents but few features which differentiate it from hypertension heart without coronary disease. Furthermore, the management is practically the same as for congestive heart failure from any other cause. This report is concerned only with that type of coronary disease in which the manifestations consist of paroxysms of pain or acute dyspnea unassociated with congestive heart failure. This group may be termed the anginal group, if it be understood that this term is used in a broad sense for attacks of pain or paroxysmal dyspnea of cardiac origin, with a

tendency to sudden death. Since there are usually no diagnostic objective clinical features in this type, the diagnosis is frequently very difficult. The condition is easily recognized when the symptoms consist of the typical attack of angina pectoris, as first described by Heberden,² in 1768. However, attacks approaching this typical picture occur in not more than one-half of the cases. There is a great variety of atypical types, many of which present a clinical picture bearing little resemblance to the characteristic attack of angina pectoris. In such cases there are a number of points which require careful consideration, any or all of which may be of aid in arriving at a diagnosis. These diagnostic features may be enumerated as shown in Tables 3 and 4.

TABLE 3.—GENERAL DIAGNOSTIC FEATURES

1. Age
2. Sex
3. Family History
4. Associated Conditions
 - a. Diabetes
 - b. Hypertension
5. Habitus

GENERAL DIAGNOSTIC FEATURES

Age.—The average age at the time of death of 113 autopsied cases of coronary disease was fifty-nine and two-fifths years. Sixty-five per cent of the entire group were between the ages of fifty and seventy years. This corresponds to several other series which have been reported. The youngest patient that I have encountered with coronary disease proved by the electrocardiogram was thirty-five years of age and I have seen a considerable number between forty and fifty.

Sex.—In the autopsied group the ratio of males to females was three to one. This, however, includes also those terminating in congestive heart failure. In those presenting the anginal manifestations the preponderance of males was much greater, being about eight males to one female.

Family History.—Heredity seems to be an important factor in the etiology of coronary disease. I have seen frequent instances of several members of a family afflicted with the condition. A history of coronary disease in the family should have some bearing on the diagnosis.

Associated Conditions.—There are but two conditions which have a definite association with

coronary disease—diabetes and hypertension. In a study by the writer of one hundred autopsies on diabetics,⁶ it was found that coronary disease was present in 52 per cent of diabetics above the age of fifty, as compared with 8 per cent in non-diabetics of this age. Chart 1 graphically shows

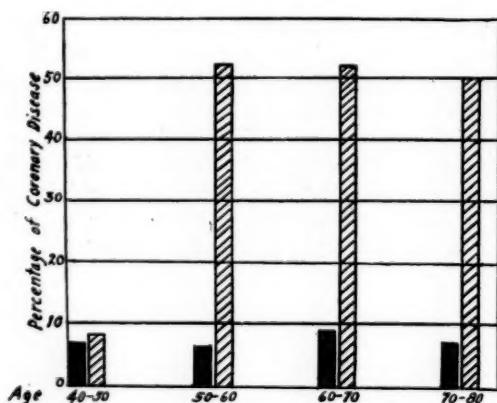


Chart 1.—Comparison of the incidence of coronary disease in diabetics and non-diabetics. (Striped columns, diabetics; solid black columns, non-diabetics.)

the incidence of coronary disease in diabetics and non-diabetics. Likewise, in hypertension heart at autopsy the incidence of coronary disease is about five times that of general autopsy material. The clinician therefore should consider more strongly the possibility of coronary disease when either diabetes or hypertension is present.

Habitus.—There is some correlation between the type of body build and coronary disease. The condition is extremely rare in the long, angular, asthenic type. It occurs most frequently in the short, broad, hypersthenic individual. Next in frequency is the tall, broad-chested type. It is true, however, that this condition may occur in an individual of normal habitus, but with less frequency. Levine and Brown,⁷ in discussing coronary thrombosis, describe the type susceptible to this condition as a well-set person, somewhat overweight, often of considerable physical strength, who has enjoyed unusually good health.

SPECIAL DIAGNOSTIC FEATURES

Of greatest importance in the diagnosis of the anginal type of coronary disease is a careful and detailed analysis of the various features of the

TABLE 4.—SPECIAL DIAGNOSTIC FEATURES
A. Characteristics of the Attack

1. Pain
 - a. Site of pain
 - b. Radiation
 - c. Type of pain
 - d. Factors inducing attack—exertion, emotion, large meals, flatulence
 - e. Cessation of attack on rest
 - f. Duration—condition between attacks
 - g. Mental reaction
 - h. Gastro-intestinal manifestations
 - i. Reaction to nitrites
2. Acute Dyspnea
 - a. Sudden onset—usually nocturnal
 - b. Examination of lungs, negative, or fine, moist râles or bronchial wheezes
- B. Physical Examination of the Heart
 1. Enlargement—definite enlargement usually absent
 2. Auscultation—usually normal, first sound may be muffled or split
 3. Cardiac rhythm
- C. Electrocardiogram—positive in about 70 per cent

attack. When the major symptom is pain, there are certain characteristics so constant and typical of the pain of coronary disease that they are of great diagnostic import, while others are so variable and uncertain that they are of decidedly less significance.

Site of Pain.—In some cases the pain may be localized to any part of the chest or even to the back. However, it is usually situated behind the sternum, either at the upper or lower end. In about 25 per cent of the cases it is localized in the epigastrium. Pain limited to either the left or right side of the chest is infrequent as compared to the central chest location. A sternal or epigastric localization of the pain should always arouse the suspicion of coronary disease.

Radiation.—Radiation to the left shoulder, arm and forearm has been considered as characteristic for the anginal type of pain. An analysis of the autopsied and clinical cases indicates that this is not as prominent nor as constant a feature as has been supposed. In the records of fifty cases it was an exception for the patient to voluntarily describe this type of pain radiation and this has usually been absent even on direct questioning. In rare cases the radiation is to the right side of the chest and occasionally to the neck and lower jaw. I have seen several individuals in whom the pain was present almost entirely in the lower jaw and who, suspecting

trouble in the teeth, had first consulted a dentist. When the pain is situated in the epigastrium, the patient often states that it spreads upward into the chest. It is true that radiation to the inside of the left arm, the area supplied by the first two dorsal roots, strongly indicates that the pain is of coronary disease origin, but the absence of such radiation does not in any way exclude the possibility of coronary disease.

Type of Pain.—The character of the pain is probably the most constant feature of coronary disease, certainly more constant than the site of the radiation and, therefore, of greater diagnostic importance. The pain typically consists of a sense of oppression. This varies from a slight pressure behind the sternum or in the epigastrium to an intense vise-like sensation with a feeling of suffocation. Sharp, lancinating pains are extremely rare in coronary disease and very frequent in the various noncardiac types of chest pain. This was emphasized by Kilgore⁸ in a comparison of chest pains in one hundred non-cardiacs and thirty-six patients with pain of cardiac origin. Of the thirty-six cases of cardiac pain, the distress was described as lancinating in but four instances, and in but one case was this unassociated with pain of a compression character. Kilgore's studies also demonstrate that true cardiac pain is most frequently substernal in location, while the most frequent site in the noncardiac group is in the left chest. Chart 2, constructed from the data of Kilgore, is a graphic comparison of the type and site of pain in the cardiac and non-cardiac groups. This difference in the character of the pain frequently serves to differentiate a true coronary disease pain from various functional conditions. Our own observations agree with those of Kilgore. In only two of fifty cases of coronary disease was the pain described as of a sharp, shooting character. From a diagnostic standpoint, therefore, the presence of a compression pain is strong support for a diagnosis of coronary disease. If the pain is sharp, sticking and lancinating in character, the probability is that it is of non-cardiac origin.

Factors Inducing Attack.—In general, the factors predisposing to an attack are overexertion, emotional strain and overeating. Of these the relation to exertion is most important, for non-cardiac pains are frequently induced by emotional excitement, as in the psychoneurotic, and by over-eating, as in certain gastrointestinal condi-

tions. The importance of these predisposing factors varies in different cases. Some patients tolerate physical activity fairly well, but are very susceptible to any emotional or mental strain. Hirschfelder⁹ points out that while mental excitement, anxiety, and especially anger, are fre-

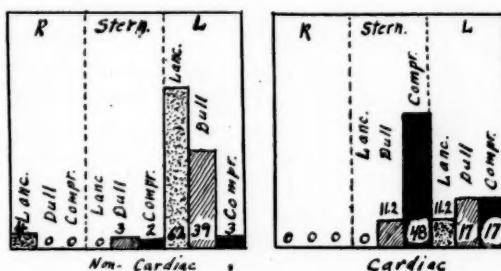


Chart 2.—Site and type of pain in non-cardiacs and cardiacs (Kilgore). Stern. indicates mid-chest; R and L indicate right and left chest; Lanc. indicates lancinating; and Compr. indicates compression type of pain.

quent factors in inducing an attack, the more gentle emotions, such as pity and sorrow, even when felt intensely, have little effect.

Cessation of Attack on Rest.—The fact that effort induces a pain in the chest and rest causes it to subside is one of the more important diagnostic points. This relationship to effort and rest is usually so definite that the patient almost invariably volunteers the information without questioning. Chest pains of other sources occasionally show some relief on rest. The effect, however, is much less marked and usually this is elicited only after the patient is directly questioned concerning it.

Although the relationship of the anginal pain to effort and rest is usually definite, the attacks not infrequently occur while the patient is at rest. This occurred in five of fifty cases and in three instances the usual relationship was reversed in that the pain was relieved by moderate exertion.

Duration of Attack.—A continuous pain in the chest practically excludes coronary disease as a basis. One of the most important diagnostic features of the pain of coronary disease is the paroxysmal character, the attack usually lasting from one to five minutes. Occasionally the pain lasts for hours or several days, and then the patient presents the features characteristic of an acute occlusion of a coronary branch by a thrombus. It also is to be emphasized that one of the

constant characteristics is the abrupt onset and sudden disappearance of the paroxysm. Between attacks the patient is usually in such excellent health that it is difficult for those about him to realize that he is suffering from a serious disease.

Mental Reaction.—Too much reliance cannot be placed on the presence or absence of any characteristic psychic reaction with the attack. It is true that a mental anguish with fear of impending death, so prominent in John Hunter's case, is frequently associated with the attack of anginal pain, and the presence of such a reaction is of some diagnostic value. However, many cases have repeated attacks and go on to death, suffering little or no psychic reaction with the paroxysms. Furthermore, many functional cases suffer lancinating chest pains, associated with great fear and often state that they feel as if they were about to die.

Gastrointestinal Manifestations.—The pain of coronary disease is frequently localized to the epigastrum. In the group of 113 autopsied cases the distress was referred to the upper abdomen in 25 per cent. Belching was not uncommon with an attack and the patient frequently was relieved by eructation of gas. It is often difficult to convince the patient that he is not suffering from a gastrointestinal condition. The severe prolonged pain of coronary thrombosis may suggest an acute abdominal condition. Vomiting is not rare and there may be marked tenderness and rigidity in the upper abdomen. It is frequently necessary to consider every diagnostic point to differentiate between a coronary occlusion and a surgical abdomen. The most important points in favor of coronary disease are muffled heart sounds or gallop rhythm, the presence of cyanosis, and dyspnea and characteristic electrocardiographic alterations. Dr. Arthur Zierold¹⁰ has made a suggestion which should be helpful in differentiating an attack of pain of coronary origin from that of an acute abdominal condition. The spasm of the abdominal muscles associated with a diseased viscous is the result of a reflex, the afferent impulses passing to that portion of the spinal cord which is in segmental relationship to this viscous. The reflex is completed by efferent impulses passing from these segments of the cord to the muscles supplied by them. The afferent supply of the heart affects the somatic nerves above the sixth dorsal segment. The nerves from these segments do not supply the abdominal mus-

cles so that a reflex spasm is not possible in a pain of cardiac origin. The muscle rigidity with the cardiac pain is merely a protective spasm resulting from cortical stimulation by the excessive pain stimulus. Dr. Zierold points out that morphine markedly depresses the cortical centers but has no such effect on the spinal reflexes. In the differentiation of a cardiac pain from a pain of a diseased abdominal viscous, morphine may be given so that the pain is relieved. A disappearance of the muscle spasm is strong evidence of a cardiac origin of the pain. If the spasm persists the evidence is in favor of a diseased abdominal organ.

Relief by Nitrates.—It is frequently of value to use amyl nitrite or tablets of nitroglycerin as a therapeutic test. Pearls of amyl nitrite or hypodermic tablets of nitroglycerin, gr. 1/150 to 1/100, are prescribed and the patient directed to inhale the amyl nitrite or place a tablet of nitroglycerin under the tongue immediately at the onset of an attack. If unmistakable relief is obtained within one or two minutes, it is almost certain that the pain is of coronary disease origin, especially if the same effect is obtained on several trials. The tablets are preferable to the amyl nitrite for this test, as occasionally a patient with functional disease responds either by way of suggestion, since the breaking of a pearl and inhalation of apparently potent drug may be impressive, or because relief is preferable to the objectionable odor of the amyl nitrite. It must also be remembered that it has been shown experimentally and roentgenologically that the nitrates act on the smooth muscle of the stomach and intestine. Abdominal pain has been controlled temporarily by nitrates when the pain was caused by spasm or hyperperistalsis of the stomach or intestine. The relief, however, is neither as immediate nor as striking as in the case of the pain of coronary disease. I have recently observed a patient who suffered attacks of upper abdominal pain. A diagnosis of coronary disease had previously been made, chiefly because the pain was relieved by amyl nitrite. However, although the duration of the attacks was shortened, relief was obtained only after a period of twenty minutes and after the inhalation of five or six pearls of amyl nitrite. Further examination revealed that the patient was suffering from cholelithiasis.

Acute Dyspnea.—The paroxysmal dyspnea of coronary disease has frequently been termed car-

diac asthma, a rather unsatisfactory term, since it has no relationship to true allergic asthma and may have several underlying mechanisms. The attack consists of a paroxysm of acute orthopnea lasting a few minutes to several hours, coming on usually during sleep, but sometimes after exertion or over-eating. This varies in degree from a mild and short attack to an intense, agonizing distress which may end in death.

Any attack of nocturnal orthopnea starting in an individual above the age of forty should suggest a strong possibility of coronary disease. The diagnosis is usually not difficult. In contrast to the cardiac type, allergic asthma usually begins in young individuals and there is frequently a history of sensitization to foreign protein and of respiratory infections.

If the patient is seen in an attack, examination of the chest will reveal one of three conditions: (1) an absence of abnormal physical signs; (2) evidence of bronchial spasm as indicated by squeaky, wheezy rhonchi; or (3) many fine moist crepitations throughout the lungs. The first type is due to a disturbance in the respiratory center, resulting in Cheyne-Stokes breathing. The breathing is rhythmic during the day and the patient may be free of symptoms. The usual history is that just as he is dozing off at night, the patient is awakened by a paroxysm of labored breathing which forces him to sit up in bed gasping for breath. After a short period he falls asleep again, but may be awakened by similar attacks several times during the night. If the patient is carefully observed or if pneumographic tracings are taken, it will be found that a marked Cheyne-Stokes respiration is present and that the patient dozes off in periods of apnea and is awakened by one of the periods of hyperpnea. These attacks usually last for but a short time and are not very distressing except as they interfere with proper sleep.

The second type is more severe and prolonged. The acute orthopnea is due to a bronchial spasm. The onset is usually sudden and the dyspnea reaches the maximum very quickly. Inspiration and expiration are usually affected. The chest is filled with wheezy, musical bronchial râles such as occur in the true asthmatic.

The third type is the most severe and serious and may end in death. The orthopnea is a result of an acute edema of the lungs due to a sudden failure of the left ventricle. This usually occurs

during the night but may be brought on by exertion, as straining at stool, or may follow a heavy meal. A painful oppression of the chest is followed by a spasmodic cough and usually an abundant expectoration of frothy pink sputum. The dyspnea is extreme and cyanosis is present. On auscultation many fine subcrepitant râles are heard first just at the bases and then throughout the lungs. The attack lasts from one-half to several hours and there is a disappearance of the signs in the lungs in a comparatively short time.

Physical Examination of the Heart.—It must be emphasized that an absence of diagnostic physical signs is the rule in coronary disease. The heart is usually normal in size although there may be some enlargement if hypertension is present. Even in such cases the cardiac dilatation is frequently so moderate that it will escape detection on physical or roentgenologic examination. In the cases with the short anginal attacks auscultation as a rule reveals no abnormality in the heart sounds. The rate and rhythm are usually normal. A muffling or splitting of the first sound at the apex may occasionally be present, a physical sign of doubtful diagnostic significance. In the prolonged attacks of pain associated with coronary thrombosis the heart sounds are usually very distant and muffled and the first sound may be reduplicated. Gallop rhythm and pulsus alternans are frequently present. Disturbances in rhythm of the heart are frequent in coronary thrombosis but rather unusual in coronary disease without thrombosis. In sixty cases of coronary sclerosis studied electrocardiographically by the writer, extra systoles were present in 18 per cent, auricular fibrillation in 6.6 per cent and complete heart block in 1.6 per cent.

In the evaluation of the significance of extra systoles, the time of onset is of great importance. In an individual above the age of forty, extra systoles of long standing are of little importance, while such an arrhythmia of recent origin is suggestive of coronary disease. It is apparent that as compared to the subjective features, the objective examination is of a minor value in the diagnosis of coronary disease.

Electrocardiogram.—It is as an aid in the diagnosis of coronary disease that the string galvanometer undoubtedly has its greatest value to the clinician. Experimentally, it has been demonstrated that interference with the coronary circulation results in characteristic changes in the

electrocardiogram. The writer,¹¹ from an electrocardiographic study of sixty cases of coronary disease, arrived at the following conclusions: The presence of a widened notched QRS or T wave inversion in significant leads is usually indicative of coronary disease. Other possible causes of such changes, as a large hypertension heart, aortic valvular disease with left ventricular dilatation, the post-diphtheritic and myxedema heart, may be easily differentiated and excluded. In the absence of these conditions the QRS and T wave alterations mentioned are diagnostic of coronary disease. Certain lesser deviations in the electrocardiogram such as low amplitude, minor notchings and depressed T wave, while not pathognomonic, should not be disregarded. When the clinical picture is suggestive, the presence of these lesser deviations should be considered as additional support for the diagnosis of coronary disease. An abnormal electrocardiogram is present in approximately 70 per cent of cases. Table 5 is a summary of the electrocardiographic findings in sixty cases of coronary disease.

TABLE 5.—ELECTROCARDIOGRAPHIC FINDINGS IN 60 CASES OF CORONARY SCLEROSIS

	Number	Per cent
Inversion of T.....	53	88
Lead I.....	24	40
Leads I and II.....	99	15
Leads II and III.....	17	28
Leads I, II and III.....	3	5
Coronary T (Pardee).....	13	21
Changes in QRS		
Bundle branch block.....	6	10
Arborization block.....	2	3.3
Moderate notching.....	11	18
Slight notching.....	18	30
Low Voltage.....	9	15
Prolonged P-R.....	4	6.6
Arrhythmias		
Extra systoles.....	11	18
Auricular fibrillation.....	4	6.6
Complete heart block.....	1	1.6
Ventricular Preponderance		
Definite left.....	18	30
Slight left.....	18	30
Slight right.....	2	3.3

To summarize, the diagnosis of coronary disease depends on a proper evaluation of a number of points, especially in the patient's history. The string galvanometer when available is of great value. Although not essential for a correct diag-

nosis in many cases, the electrocardiogram is frequently of great value in confirming the clinical impression. There is no doubt that fewer cases would be overlooked if the frequency of coronary disease were appreciated and the condition constantly kept in mind. In a patient complaining of upper abdominal or chest pain, coronary disease must be considered, especially if the individual is a male, above the age of fifty and of the hypersthenic habitus. The presence of this condition in other members of the family and the association of diabetes or hypertension increases the probability of coronary disease. A careful analysis of each case, giving the proper value to the various points discussed, will usually enable the clinician to arrive at a correct diagnosis.

TREATMENT

There are two chief indications in the treatment of the anginal type of coronary disease: (1) treatment of the attack; and (2) the treatment directed at the underlying pathology and the prevention of attacks.

For the attack, the nitrites, first introduced by Sir Lauder Brunton in 1867¹² in the form of amyl nitrite, are still unsurpassed. Nitroglycerin was introduced by William Murrell in 1879.¹³ The nitrites are effective in approximately 75 per cent of the cases of cardiac pain. In our experience the nitrites are about as effective regardless of whether the blood pressure is or is not elevated. The effect is much less certain if the manifestations are paroxysms of dyspnea although the same treatment should be tried. The inhalation of a "pearl" of amyl nitrite crushed in a handkerchief usually effects some relief in from thirty seconds to one minute. Nitroglycerin in the tablet form is preferable for several reasons. With the amyl nitrite the relief does not appear as certain as with nitroglycerin, especially in severe cases. Furthermore, the dosage of the amyl nitrite cannot be as accurately controlled, since this depends on the number and depth of the inhalations. The odor is frequently objectionable to the patient and those about him. Another point of practical importance, especially where attacks are frequent, is that the tablets of nitroglycerin are much less expensive. In bottles of 100 the tablets may be purchased at from seventy-five cents to one dollar, while the amyl nitrite is sold for about ten cents for each pearl. A freshly prepared

hypodermic tablet of nitroglycerin gr. 1/100 or gr. 1/150, placed under the tongue, brings relief in from one to two minutes. It should be emphasized that hypodermic tablets be especially designated as the tablets for oral use dissolve more slowly and are thus less effective. When taken by stomach the drug is about one-half as effective and relief usually does not appear for about ten minutes. A frequently mentioned objection to the use of the tablets is that the drug may deteriorate in this form and thus become comparatively inert. Although this possibility theoretically exists, in practice the hypodermic tablets with the modern methods of preparation retain their potency for long periods. An unsatisfactory therapeutic effect may be due to faulty tablets, a wrong mode of administration or inadequate dosage. The physician should first proceed to examine the tablets to determine whether they are in the hypodermic form and dissolve quickly and whether they appear fresh or old, hard or discolored. He may find that the patient is taking the tablet by stomach instead of by the sublingual route. If these points are corrected and the effect is still unsatisfactory, an increase of the dosage should be tried. Ingalls and Meeker¹⁴ emphasize the fact that large doses are often needed and when ordinary doses are ineffective the patient may obtain relief by increasing the number of tablets. Osler also states that nitroglycerin is too timidly used and then abandoned as ineffective. If the physician increases the dose gradually, no harm can come, with the exception of some headache. The patient should be warned of possible dizziness and headache, and assured that this reaction is harmless. It is frequently wise for the physician to test the tolerance of the patient in the office to determine the degree of dizziness, palpitation and headache with a certain dosage. Nitroglycerin may also be used in the form of the spirit of nitroglycerin, also known as spirit of glonoin, spirit of glyceryl trinitrate or liquor trinitri. One or two drops of this preparation placed under the tongue has the same effect as the tablet. In the use of the liquid form, the U. S. Pharmacopeia advises pouring a solution of potassium hydroxide if any is accidentally spilled, otherwise after evaporation of the alcohol, a highly explosive substance remains. The tablets are more convenient to carry and to apply. The patient must be instructed to have the drug close at hand at all times and to admin-

ister it immediately at the onset of the attack. A drink of whiskey or brandy will check the attack of pain in many cases. This was noted by Heberden in his original description in which he stated that "wine and spirituous liquors afford considerable relief."

In the prolonged and severe attacks of pain with fall of blood pressure, resulting from a thrombosis of a coronary branch, the pain is seldom relieved by nitrates and their administration may be harmful. An additional drop in the arterial pressure may occur, intensifying the degree of shock. The pain can be relieved only by morphine and the dose should usually be no less than one-half grain, which should be repeated if necessary. Smaller doses are usually ineffective in this condition.

If the attack consists of a paroxysm of dyspnea, the nitrates should be tried, but frequently are ineffective. Palmer and White,¹⁵ in a review of a series of cases of cardiac asthma, found that nitrates gave some relief thirty-seven times, and no relief twenty-eight times. The relief is much less striking than in the cases of cardiac pain. Morphine is the most reliable remedy, regardless of whether the shortness of breath is due to edema of the lungs or bronchial spasm. If auscultation of the lungs indicates that bronchial spasm is present, adrenalin or ephedrin may be used. These drugs seem to be as effective in the attacks of bronchial spasm associated with coronary disease as in the true allergic asthma. In cases having frequent attacks, ephedrin in .050 gr. doses two or three times a day has been successful in preventing attacks. I have seen many patients in whom one capsule of ephedrin at bedtime has prevented nocturnal attacks of bronchial spasm which previously had been relieved only by a hypodermic of morphine. Bloedorn and Dickens¹⁶ from observations on a single case conclude that ephedrin is a dangerous drug in cases showing evidence of cardiac damage, stating that it may produce acute cardiac decompensation and pulsus alternans in patients with damaged hearts. I have observed no harmful effects from the use of ephedrin in cardiacs, unless the drug was continued in a patient showing an untoward reaction, such as tachycardia, tremor, nervousness and weakness. Many of the cases of nocturnal paroxysmal dyspnea of coronary disease are associated with Cheyne-Stokes respiration, the patient awakening in the phase of hyperpnea. This

abnormal type of respiration may frequently be successfully treated by the use of an ampoule of ephyllin, 0.5 gm., administered either intramuscularly or intravenously. In addition to the use of morphine, venesection is usually recommended in cases showing edema of the lungs. I have been impressed with the frequency of a shock-like condition associated with the edema of the lungs of coronary disease. The venous pressure as evidenced by collapse of the jugular veins is low, due to a peripheral circulatory failure with active dilatation of the splanchnic vessels. In such cases venesection is certainly not indicated and the procedure should be attempted only where there is evidence of increased venous pressure as indicated by distended jugular veins. Obrastzow and Strashesko¹⁷ mention a case in which they opened the cubital vein and the venous pressure was so low that no blood was obtained.

The treatment for the purpose of preventing attacks may be divided into: (1) certain general measures to readjust the patient's activities and habits; (2) drug therapy; and (3) surgery.

General Therapeutic Measures.—The most important feature in therapy is the rearrangement of the individual's activities and habits. A life free from mental and physical strain must be ordered. Too often the physician dismisses this most important feature in therapy with the brief instruction to the patient to "take things easy." This is insufficient, for it is important to make a careful study of the activities and mental and physical habits of each patient and the factors inducing the attack. It is difficult to formulate any general rules of management as each case must be considered individually. A balance must be arranged between too much and too little restriction. Some patients require extreme limitation, others are benefited by moderate exercise. It is very seldom that complete bed rest is necessary. However, if the attacks are persistent in spite of definite restriction, rest in bed for a short period with a gradual increase in activities should be tried. It is seldom also that the patient is required to give up his business or profession. Each patient's work and his physical and mental reaction to that work must be studied. A reduction in the time and the amount of work, elimination of the factors tending to mental and emotional strain and reasonably frequent periods away from work will usually permit the patient to carry on much of his usual activity.

It is very important that a proper state of mind is established. It is necessary to impress the patient sufficiently so that he will follow instructions and yet to reassure him so that he does not become unduly apprehensive. It is surely not a successful therapeutic result to obtain a restriction of physical activities at the cost of additional mental strain. In addition the patient should be familiar with the causes which are most liable to induce an attack, such as sudden, prolonged and strenuous exertion, emotional excitement, overeating, especially if followed by some exertion, excessive use of tobacco, constipation and straining at stool. He will then be able to make an effort to avoid these predisposing factors.

A degree of physical exercise, and this varies in individuals, is not harmful and may be beneficial. The degree of exertion must always be below the pain producing level. Walking is the best form of exercise. This is well tolerated with few exceptions, if it is not done immediately after meals, in the face of a wind, or in extremes of weather. Many patients may indulge moderately in golf, especially if on a fairly level course.

Restriction in diet is important. This consists chiefly in ordering meals small in amount to prevent overloading and distension of the stomach. If the patient is overweight this will also have a favorable effect in reducing the weight. Small lunches between meals may be added if necessary. Seasoned, irritating and fried foods and those containing much roughage should be eliminated to prevent flatulence. A short rest after each meal is necessary and no exertion should be attempted for at least one-half hour. Tea and coffee may be used in moderate amounts. To eliminate coffee in an individual who is accustomed to its use is inconsistent when one considers that caffeine is tri-methyl xanthine and the chief coronary dilating drugs usually administered are also xanthine derivatives. Alcohol in small amounts may be well tolerated, but overindulgence is distinctly harmful.

In all cases it is of importance to regulate the use of tobacco and in many individuals it is advisable to exclude it completely. With many patients accustomed to the use of tobacco, the smoking of part of a cigar or a cigarette after a meal promotes the desired relaxation and rest. Restriction in these cases is more beneficial than complete exclusion of tobacco. There are no

conclusive clinical or experimental observations which support the theory that tobacco will cause or increase the tendency to arteriosclerosis. Albutt¹⁸ concluded that the effect of tobacco in hypertension and arteriosclerosis was negligible. Johnson¹⁹ found in sixty patients suffering with angina pectoris that 70 per cent were smokers and 30 per cent non-smokers. Of a control group of 1,000 adult males, 81.8 per cent were smokers. His conclusion was that tobacco was a very doubtful etiological factor. Arteriosclerosis has been noted in rabbits after the injection of nicotine. These observations have been poorly controlled and conclusions from these experiments are unreliable. There is evidence, however, that tobacco may cause acute constriction of the blood vessels, and it has been noted that excessive use of tobacco may induce anginal attacks. Moschcowitz²⁰ reports in a group of cases a striking cessation of typical anginal attacks in heavy smokers when tobacco was withdrawn. There is no doubt that most individuals with diseased coronary vessels will be less susceptible to attacks if tobacco is definitely restricted or excluded.

Use of Coronary Dilators.—The chief drugs for this purpose are the xanthin derivatives. Caffein is trimethylxanthin, theobromin is dimethylxanthin, its isomer theophyllin is usually known the trade name of theocin. There are many compounds of these drugs, the one which has been for the longest time in general use being theobromin sodium salicylate, known as diuretin. As early as 1895 Askanazy²¹ called attention to the effectiveness of this drug in anginal manifestations. In 1902 Breuer²² confirmed the observations of Askanazy and stated on the basis of five years' experience "that he considered the use of theobromin in cardiac asthma and angina pectoris as one of the most praiseworthy therapeutic attainments of the last ten years." More recently there has become available the calcium salt of theobromin and salicylic acid known as theocalcium and a compound of theophyllin, theophyllin ethylenediamine, known by the trade name of euphyllin or metaphyllin. Experimentally it has been shown that these drugs definitely dilate the coronary arteries, increasing the flow through these vessels in doses comparable to that which can be administered therapeutically. Smith, Miller and Gruber²³ show that euphyllin increases the rate of coronary flow from 40 to 90 per cent

and that this gain is independent of the accelerated heart action. They state that the action of this drug compares favorably with that of glyceryl trinitrate but that the effect is much more prolonged. Caffein sodio-benzoate and theobromin sodio-salicylate have no such favorable effect on the coronary circulation. Theophyllin increased the flow from 25 to 40 per cent.

The work of Gilbert and Fenn²⁴ indicates that in point of efficacy the drugs assume the following order: theobromin and its derivatives, most effective; euphyllin, theophyllin sodium acetate and caffeine have the least effect on the coronary circulation. Musser²⁵ found euphyllin very effective in the treatment of cardiac pain and paroxysmal dyspnea. Gilbert and Kerr²⁶ used the various compounds of theobromin and theophyllin in eighty-six cases of anginal pain. They considered that theobromin and its compounds were somewhat more effective but found that certain cases responded to euphyllin which did not respond to theobromin or its compounds. Many of the xanthin derivatives have untoward effects which limit their use. These consist of nausea, occasional emesis, burning in the epigastrum, palpitation and dizziness. With the exception of theobromin, theocalcium and euphyllin, these preparations can be used only by a few patients for more than a few days without ill effects. Our own procedure has been to use theocalcium and euphyllin alternately. Theocalcium is supplied in 7.5 grain (0.5 gm.) tablets and four to eight tablets are prescribed a day. This drug has been administered to many cases for long periods without gastric irritation and with beneficial effects in preventing anginal attacks. Euphyllin or metaphyllin is supplied in 1.5 grain (0.1 gm.) tablets and dosage varies from four to ten tablets a day. The patient is advised to use one of the preparations for from ten days to two weeks and then to shift to the other drug for the same period. Theominal, a preparation consisting of theobromin, 5 gr., and luminal, 0.5 gr., is valuable where a sedative is needed and may be used in conjunction with or alternating with euphyllin. Erythrol tetranitrate, gr. 0.5, three times daily, has been used in a small group of cases in which hypertension was present with apparently favorable results.

Surgical Measures.—In recent years much attention has been given to the surgical treatment of the anginal pain. The aim of the various

methods which have been used is the interruption of the afferent nerve fibers which convey the impulses arising in the heart. The most important routes of sensory impulses from the heart are by way of the upper, middle and lower cardiac nerves to the cervical sympathetic trunk and also by way of a large number of fibers coming into the stellate ganglion. There are also lower fibers which enter the dorsal sympathetic chain. The impulses then pass from the cervico-dorsal sympathetic chain to the spinal cord by way of the rami communicantes of the upper dorsal nerves. The literature is replete with descriptions of a variety of methods for the interruption of these sensory routes. The chief point of attack has been the cervical sympathetic chain. Jonnesco²⁷ in 1916 first removed the upper three cervical ganglia and the first dorsal sympathetic ganglion on both sides. With this elaborate procedure he reported good results. Various less radical operations on the cervical sympathetic chain have been suggested. In 1923 Coffey and Brown²⁸ removed the superior cervical ganglion in five cases with relief of pain, a comparatively simple procedure. This method has been used extensively. It has been demonstrated that there are no sensory fibers in the superior cervical ganglia and there is therefore no blocking of sensory impulses by this operation. This ganglion has a purely motor function and any favorable effects following its extirpation can only be explained by a coronary vaso-dilatation resulting from a suppression of vaso-constrictor impulses. Wenckebach²⁹ has proposed that the sensory impulses from the heart are carried by the depressor nerve. Eppinger and Hofer³⁰ tried cutting the depressor nerve, and report a certain amount of relief. Cutler,³¹ who in this country has had considerable experience with the various methods, states that it is doubtful whether this nerve can be identified in an operative procedure. Cutler has reviewed 120 cases subjected to various types of operation. The best results were obtained by the radical operation of Jonnesco, interrupting both sensory and motor fibers with relief in 62.9 per cent and improvement in 18.5 per cent. Simple extirpation of the superior cervical ganglion resulted in relief in 34.4 per cent and improvement in 38 per cent.

Surgery upon the cervical sympathetic chain is usually followed by certain disagreeable after-effects. This includes enophthalmos, myosis, pto-

sis of the lid, and absence of flushing or sweating on the operated side. (Horner's syndrome). Also sensory disturbances may follow for a variable period, such as burning sensations and hyperesthesia of the face, neck and upper chest.

More recently the blocking of the pain impulses from the heart has been attempted by a less radical procedure, the injection of the dorsal root ganglia. This was first carried out by Mandl,³² who injected novocaine paravertebrally with excellent results in sixteen cases. Swetlow³³ in this country has published several reports and describes his technic in detail. He uses 85 per cent alcohol, injecting paravertebrally the upper five to eight dorsal ganglia with much success in the relief of the precordial pain. In most cases there is some benefit, and in many the pain entirely disappears. This method requires some experience in nerve injection and a knowledge of the anatomy. An improper injection yields no benefit and may injure the pleura, or spinal cord, causing a serious reaction. Certain disagreeable after-effects may follow the paravertebral injection procedure, usually lasting but a few days, but occasionally for weeks. These consist of burning sensations, paresthesias, and hyperesthesia of various parts of the chest. Richardson and White³⁴ compared the results of cervical sympathectomy with those of paravertebral alcohol injections and conclude that the injection method is superior. Since the injections were first attempted by these observers, the results have been so favorable that the operative methods have been discontinued.

It must be emphasized that these methods of treatment are purely symptomatic. There is no attempt to cure or relieve the underlying pathology unless it be the questionable vaso-dilatation of the coronary arteries which may follow the extirpation of the motor fibers in the superior cervical ganglion. It is clear from a review of the reported cases that life is not prolonged and that the tendency to sudden death is not avoided. It certainly may be argued that suppressing the pain removes a warning signal, a valuable indication to the patient that the heart has been overburdened. Mackenzie³⁵ strenuously criticizes the surgical treatment for this reason. He points out that many patients learn to recognize the significance of the pain and the circumstances that provoke it and by avoiding these circumstances can often lead useful lives free from distress for

many years. Many serious cases of angina pectoris are relieved by this method. The writer, however, has found it suitable only as a palliative measure in cases of angina pectoris which do not respond to medical treatment.

Radiation therapy has been used in the treatment of coronary artery disease. Thus far the results have been inconclusive.

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many years. This justifiable criticism deserves serious consideration. It must be remembered that the trouble does not lie in the pain, but in the underlying pathological condition. The surgical and injection methods should be reserved only as a last therapeutic resort to patients suffering from intense, incapacitating anginal pain which does not yield to simple measures. Such cases occasionally are encountered and the injection in capable hands is distinctly indicated. The writer, in an analysis of fifty-five patients with anginal pain, found but one case that appeared suitable for this type of treatment. It is clear that the radical measures are rarely necessary, as most patients remain reasonably comfortable, employing the simpler methods of treatment.

Radiation therapy is frequently mentioned as a treatment, especially in the French literature. Thus far the duration of observation of the treated cases has been insufficient to justify any conclusions as to the value of this method. The basis of this method is that the posterior ganglia might be influenced by radiation much the same as by the injection of alcohol. Sussman³⁶ in this country demonstrated in animals vacuolization of the cells and edema in the sympathetic ganglia after irradiation. He reports favorable results in sixteen cases but states that the period of observation has not been sufficiently long to warrant definite conclusions.

Diathermia has also been attempted on the theory that an increased temperature might induce dilatation of the coronary system. Brown, Alt and Levine³⁷ in animal experiments concluded that appreciable changes within the chest could be obtained only when such intense diathermic currents were employed that serious burns and sloughing of the tissues were likely to occur.

SUMMARY

1. There are two distinct clinical pictures associated with coronary disease: (1) the anginal syndrome consisting of attacks of pain or acute dyspnea; and (2) the manifestations of congestive heart failure.

2. Coronary disease with congestive heart failure is usually associated with hypertension and presents practically the same problems in diagnosis and treatment as congestive failure from other causes.

3. The diagnosis of the anginal type is fre-

quently very difficult as the clinical picture may be atypical and variable.

4. The diagnostic features of the anginal type are enumerated and discussed and an evaluation made of the various diagnostic criteria.

5. Significant physical signs are usually absent.

6. The electrocardiogram is of great aid in diagnosis, and shows some abnormality in about 70 per cent of the cases.

7. There are two chief indications in treatment: (1) the treatment of the attack; and (2) therapy directed toward the underlying pathology and the prevention of attacks.

8. The anginal pain is most favorably treated by the sublingual administration of hypodermic tablets of nitroglycerin in sufficient dosage. The disadvantages of other nitrates are discussed.

9. Paroxysmal dyspnea reacts less favorably to nitroglycerin and usually requires morphine. Many cases respond satisfactorily to ephedrin.

10. The therapy aiming at the prevention of attacks includes: (1) the readjustment of the patient's activities and habits; (2) the use of coronary dilating drugs; and (3) surgical methods for interrupting the sensory impulses from the heart. These therapeutic methods are discussed in detail.

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THE REMOTE EFFECTS OF HEAD INJURY*

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IN A recent article, "The Neurological Aspect of Head Injury," published in MINNESOTA MEDICINE for June, 1931, we discussed, in a general way, the neurological phases of head injury, especially those which manifest themselves at the time of injury and immediately afterward. It is now our desire to proceed further and discuss the remote effects of head injury, from the neurological standpoint, particularly those effects which may appear to be permanent and which from a compensable point of view have such an important bearing upon the opinion which the physician is to give in Court or before the Industrial Commission. With the ever-increasing number of head injuries, industrial and otherwise, it is important for every medical man to be familiar with the accepted status of the various disabilities which are claimed as a result of head injuries. The purpose of this presentation is to review the various remote effects of head injury, and to present briefly their "present-day" status. By remote effects we mean those which persist for a period of longer than three months after the injury, or which make their initial appearance more than three months after the injury is received.

First of all it is proper to enumerate all of the possible remote effects which may be concerned with the disability of the injured individual, and with respect to which the questions of permanency and disability may arise. They are as follows: (1) mental impairment or mental derangement; (2) epilepsy; (3) cranial nerve injuries; (4) paralyses; (5) functional nervous disorders of various kinds.

Each of these occupies its own place in relation to head injury, and the most intelligent discussion can be arranged, therefore, by taking them up one at a time.

Mental Impairment or Mental Derangement.—Insanity following head injury and due exclusively to the injury itself is comparatively rare, even in cases where there has been severe skull and brain injury. While the so-called

"traumatic psychosis" is a definite entity, its existence means that there must be structural injury to the brain, either by laceration, contusion or hemorrhage, or by depressed skull fracture. It implies, also, a certain sequence of symptoms and cannot be accepted as a diagnosis if there is a long interval between the time of injury and the onset of the mental symptoms. Adolph Meyer, in 1904, presented the original conception of traumatic insanity, and, peculiarly enough, his original conception has remained almost unchanged up to the present time. The typical case of insanity, due solely to head injury, must conform to the following sequence of events: A severe head or brain injury followed by unconsciousness or delirium, recovery later with grave defect symptoms, with marked changes in behavior, with sullenness, irritability, increased susceptibility to alcohol, dizziness or vertigo, and a psychosis which usually becomes progressively worse. There must be direct continuity in its development, with no intervening period during which the individual is normal. This is the only situation in which insanity may be correctly attributed to head injury alone. Mental derangement may follow head injuries and even injuries to other parts of the body, but in the absence of structural damage to the brain or in non-cranial injuries, the trauma cannot be construed as the entire cause of the insanity. It must be viewed as a contributing factor in a predisposed individual. Here, again, there must be direct continuity established between the time of the injury and the onset of mental symptoms. It is well recognized, at the present time, that if insanity is to be attributed to trauma, either as a sole cause or as a contributing factor, there must be shown direct continuity and sequence of symptoms from the time the injury is received up to the time the mental symptoms first appear, and that if there is a period of more than thirty to ninety days after the injury, with no mental symptoms, then it is extremely unlikely that the injury is a causative factor.

Head trauma may supply the emotional factor which precipitates a manic-depressive psychosis

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in a person predisposed to it. Likewise, it may be a contributing factor in lighting up a dementia precox, which was present, but latent, before the injury. However, neither of these must be confused with traumatic insanity. Here, again, must be established direct continuity and sequence between the injury and onset of symptoms, with no appreciable period of normal recovery between the two. It is definitely recognized that head injury plays a part in the development of dementia paralytica, presumably by increasing the permeability of the cerebral vessels to the spirochete and the luetic virus, thereby causing a latent syphilis to become active and cerebrally localized. Here, as in other insanities, the time relationship is most important, and each case must be evaluated through study of the history of the mental condition prior to the injury, and the length of time, after injury, before mental symptoms appeared.

In dementia paralytica, if mental symptoms appear immediately following head trauma, then no just claim of causation can be made for the injury, because the organic and structural changes of dementia paralytica cannot develop rapidly. An interval at least of several months is necessary for these to occur, subsequent to the injury, and yet this interval must not be too long. There is difference of opinion as to the length of this period, but its limits are accepted, usually, as from six months to two years. In other words, if the symptoms of dementia paralytica appear within six months following the injury, or later than twenty-four months after the injury, then the injury itself is not a causative factor in the development of the disease.

In all cases of insanity, supposedly caused by injury, one must obtain, from reliable sources, a most careful background of family and personal history, development of personality, and presence of peculiar characteristics in the individual during his lifetime prior to the injury. Honest and well-meaning persons will often make very definite statements that the individual was perfectly well prior to the injury, when as a matter of fact he was actually psychotic or nearly so. It is a persistent and erroneous belief among people that insanity is often caused by a blow on the head, even years before the onset of the psychosis, and they invariably try to connect some trivial bump on the head with the evolution of a mental disorder. Actually, however, statistics prove that

only a fractional part of one per cent of insanity cases in institutions is associated with trauma as a causative factor.

Mental deficiency or feeble-mindedness, following head injury, is almost unknown. It cannot occur unless there has been severe structural brain injury. It is very common for feeble-mindedness to be claimed in children who have had head injuries of one kind or another, but careful checking up of the child's history, before the injury, will usually prove that if feeble-mindedness is present it was congenital. Any claim of parents or attorneys that a child who has sustained a head injury is feeble-minded as a result of it, should instantly rouse suspicion in the mind of the physician, and he should investigate very carefully before expressing his opinion.

Epilepsy.—In the case of epilepsy following head injury, as with insanity, the medical man must use extreme care in arriving at a conclusion, for here, again, the public is prone to furnish information which is not fact. In the first place, very few head injuries result in epilepsy. A most careful history of the individual and his family should be obtained, and in the greater percentage of cases, especially in those where there has been no structural brain injury or skull fracture, it will be proven that if epilepsy really exists, it was there before the injury. This is especially true in epilepsy of the idiopathic form. If the Jacksonian type of seizures occur, that is evidence of focal brain irritation and is much more likely to be traumatic in origin. Frequently, in severe head injury, epileptiform spells will occur soon after the injury—possibly in a few moments or a few hours. In these cases, it is usually due to sudden brain irritation, caused by edema or hemorrhage, and disappears promptly with the subsiding of the edema or absorption of the hemorrhage. If due to depressed skull fracture, operative interference will relieve the attacks. These spells occurring soon after injury cause less anxiety than those appearing some months later, due to scar formation, cysts or other secondary changes in brain structure. It must be borne in mind that the emotional reaction from an head injury may light up an old epilepsy which had been quiescent for a long time. If this occurs, it must be conceded that the injury was contributory in cause, as it aggravated a preexisting condition. It is difficult to give an accurate "elimination period" for

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epilepsy which follows head injury. It is, however, generally conceded, that if spells begin later than one year after the injury, the epilepsy is not due to trauma, unless some focal brain injury can be demonstrated.

In the *London Lancet*, for October 27, 1928, W. W. Wagstaffe, writing on "The Incidence of Traumatic Epilepsy after Gunshot Wound of the Head," arrives at the following interesting conclusions, after analysis of three hundred and forty post-war patients who were still alive:

1. Traumatic epilepsy is nearly ten times more common in penetrating wounds of the dura than in other head injuries.

2. The site of the wound has no influence on the onset of traumatic epilepsy.

3. Traumatic epilepsy is more than twice as common in cases of penetrating wounds of the dura which show severe organic lesions, than in those which do not.

4. Traumatic epilepsy may come on at almost any time after a gunshot wound of the head. (In his series the variation was from two months to seven and one-half years.)

5. Traumatic epilepsy appears to be much more common in those patients who show transient Jacksonian fits within a few days of the injury.

6. Traumatic epilepsy is somewhat more common where a metallic fragment has remained in the brain.

7. The mortality in those who develop traumatic epilepsy is rather higher than in other cases of gunshot wounds of the head.

In the same article, he quotes P. Sargent as finding four and one-half per cent of epileptics in an analysis of eighteen thousand cases of gunshot wounds of the head.

Cranial Nerve Injuries.—In cranial nerve injuries following head trauma, the nerves most commonly affected are the first, third, sixth, seventh and eighth. These injuries manifest themselves in the so-called cranial nerve palsies, and produce paralyses or derangement of function in the organs supplied by the nerves. Loss of sense of smell, interference with the motor-oculi group, facial paralysis, and impairment or loss of sense of hearing are very common, particularly following basal skull fracture. There can be no mistake in diagnosis in cases where cranial nerve palsies are concerned, for they are always clear-cut and well-defined, and occur

reasonably soon after the injury is sustained—usually within forty-eight to seventy-two hours.

Paralyses.—Paralysis which follows head injury may be organic or functional in causation. If organic, it is the result of structural brain injury, either as a result of laceration, contusion, hemorrhage or depressed skull fracture. The paralysis appears in that portion of the body whose motor control lies in the injured brain area. We may have hemiplegia or monoplegia, complete or incomplete, with or without facial involvement, and with or without sensory involvement, depending upon the location and extent of the brain injury. Paralysis may be temporary or permanent, depending, also, upon the degree of brain injury. If functional, the paralysis is that which is ordinarily considered hysterical, and is the result of psychic trauma, and not physical or structural injury. Here, again, we may have partial or complete paralysis involving one or more groups of muscles, but in this type of paralysis the degree of disability does not depend upon the severity of the injury. Psychic trauma may occur as the result of a very slight injury, where the power of suggestion is strong enough to produce in the individual the conversion of an idea into a physical manifestation. Such paralysis is very common, particularly in cases where compensation or litigation is involved.

Functional nervous disorders of various kinds.—Functional nervous disorders following head injury presents, by far, the biggest problem to the physician who concerns himself with examination and evaluation of head injuries. Here we have an intricate mass of subjective symptoms not substantiated by objective findings. There are so many types of disorders in this group that it is not possible to discuss them singly at this time. These are the patients who have reacted emotionally to injuries which in themselves are often very trivial and which are not concerned in any way with evidences of organic injury to the brain or central nervous system. The emotional side is so disordered that fear and horror are aroused and prolonged long after the injury itself has ceased to have a prominent place in consciousness. Here we have the normal personality replaced, at least to some extent, by intricate abnormal psychological patterns, and there is more or less suppression of normal self-confidence and normal will power. Fear and anxiety

are frequently powerful enough to produce actual constitutional changes in the individual. He lives over and over again the experiences of his injury, and his resultant emotional reactions are often associated with and augmented by those mal-adaptations of his ordinary life, which had never before been oppressive, but which now appear to be tremendously exaggerated. In persons who have an adequate and well-balanced personality, these reactions, if aroused, do not last for any great length of time. They do, however, in many cases, result in so much anxiety that a change of occupation or of occupational environment is necessary to bring about a return of normal adjustment.

Head injury carries with it powerful suggestion of fear, and following such injury we are apt to have a more severe actual neurosis than that which occurs after injury to any other portion of the body. The true traumatic neurosis may constitute a very real disability, and must not be confused with the compensation or litigation neurosis, or malingering. Traumatic neuroses may vary greatly in their symptoms and severity. They are characterized and engendered by fear and anxiety, which centers upon the individual himself, concerning both his present condition and his future welfare. In the compensation or litigation neurosis, anxiety is directed particularly toward the question of how much is to be paid for the injury, or fear over having to appear in court. In the malingerer, there is willful pretense, for purposes of securing financial gain. Upon the physician falls the burden of distinguishing between these three conditions, and of determining the amount and duration of disability. In judging such individuals, there are important things to be considered. Ability to sleep, condition of body weight, ability to concentrate mentally, and general emotional stability are very important, but most important is the study of the individual himself, and the analysis of his attitude, of his motive, and of his sincerity. The true traumatic neurosis presents often very frank constitutional symptoms. The litigation neurosis and the malingerer never show these. This mammoth group of cases deserves attention, which, for lack of time, cannot be given in this presentation. They constitute the greatest problem in industrial medicine today, both to carriers of insurance, to employers and to medical men.

In conclusion, a brief discussion of permanency in remote effects of head injury is pertinent. Actual traumatic insanity is, in most cases, permanent. Arising as it does from structural brain injury, there is small chance of a return of normal mental capacity. The same may be said of mental deficiency or mental impairment arising as a result of brain injury. If the space of one year passes with no improvement in the psychosis, it can be said to be permanent. The same is true of manic-depressive insanity or dementia precox, in which the trauma has played a causative part. The prognosis in manic-depressive insanity or dementia precox, caused partially by the emotional reaction of head injury, is just the same as it would be in manic-depressive insanity or dementia precox which develops spontaneously and without head injury. In the former, sixty to seventy per cent recover; in the latter, a twenty to thirty per cent recovery may be expected. If, however, the psychosis is prolonged for one year following the injury which was concerned in its production, then one may reasonably expect permanency.

In epilepsy which arises after head injury, assuming that it is due to the head injury, we may expect permanency if the spells continue from twelve to eighteen months after the injury is received. Within that period, there is a reasonable possibility of recovery from the structural injury causing the spells and cessation of the spells.

Cranial nerve palsies and peripheral paralyses persisting for more than six months after the injury are in all probability permanent. The average cranial nerve palsy or peripheral paralysis of organic causation, which is going to recover, will do so within two to six months after the injury is received. Suspicion of permanency is justifiable after six months, and certainty of permanency is justifiable after one year has elapsed.

In the functional group of cases following head injury, we rarely find permanency. In all these cases, settlement of claims for damages and clearing up of litigation is very important, and should always be advised at the earliest possible moment. In the true traumatic neurosis, recovery will not occur as rapidly as in the compensation or litigation type. In the ordinary head trauma, where there has been no skull fracture or organic brain injury, one may expect

a reasonably rapid recovery after questions of litigation and compensation have been settled. Three months' time is usually sufficient for an individual to return to duty, in this type of case. In the simple skull fracture, without depression of fragments or brain injury, from three to six months is usually required for the individual to readjust himself. In cases where a severe traumatic neurosis arises, which is characterized by substantial loss in weight, profound insomnia, definite depression, and inability to concentrate mentally, we may have disability ranging up to eighteen months following the injury. It would be most unusual for such cases to be permanent.

In head trauma, where there has been skull fracture, with displacement of fragments, and where there has been contusion, laceration, or hemorrhage, affecting the brain or its coverings, we may have all degrees of disability, ranging from partial and incomplete disability for a number of months, with recovery, to complete and permanent disability—the result of organic changes in the brain. It is in cases of this type that particular skill is required in summing up the individual's condition and arriving at an accurate conclusion as to what may be expected in his future.

One difficulty very frequently encountered by

the physician, in his attempt to rehabilitate the functional nervous case following head trauma, is the impossibility of securing some light form of work for the patient. Many cases, receiving comparatively minor head injury, are so overcome with fear as a result of the circumstances which surrounded their injury, that for a time they are unable to command themselves sufficiently well to return to their normal occupation. This is true, particularly, in individuals who work in high places, such as structural steel workers. In these cases, rehabilitation may often be accomplished if the individual can be given some light form of work, where he can reeducate himself and set aside the fear which has possessed him. It is very difficult to secure coöperation from employers, who cannot understand why a man who looks physically strong should be unable to resume his former occupation in the air.

Time does not permit further discussion of this intensely interesting subject, which is so pertinent to physician, insurer and employer today. It behooves every medical man who is concerned in this type of practice to give attention and study to this group of cases, in order that justice be meted out to all concerned.

1068 LOWRY MEDICAL ARTS BUILDING.

TUBERCULOSIS IN A RURAL COMMUNITY*

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THE ARE 1,400 organizations throughout the United States, the primary object of which is the eradication of tuberculous disease. The mortality rate of tuberculosis has decreased from 202 per 100,000 population in 1900 to 97 per 100,000 in 1922. This achievement has been possible only through the constant energetic work of these anti-tuberculosis societies and of individuals primarily interested in the disease. Thus far, their efforts have been concentrated upon cities and their environs. Rural communities have received some attention; yet the interest and active coöperation of country practitioners have not been enlisted fully.

Perhaps the greatest good that a paper such as this might accomplish is to demonstrate that any country community presents a fruitful field in which to continue the campaign against tuberculosis. If this is shown, and if thereby the interest and coöperation of rural practitioners are aroused, then a course of procedure available to the country doctor for the diagnosis of early as well as advanced cases of pulmonary tuberculosis must be outlined. It is hoped that the narration of events experienced in the attempted control of the disease in the farm region centering around the village of Swanville, Morrison County, may help to accomplish either or both of these ends.

During the summer and fall of 1929, first whooping cough and then measles reached the proportions of mild epidemics. Both of these diseases predispose to tuberculous infection, and their occurrence gave a warning that an increased incidence of tuberculosis might be expected. In December, a high school girl died of tuberculous meningitis. Several months later a high school graduate of the previous year was found to have moderately advanced pulmonary tuberculosis. In June, 1930, a three year old girl died of tuberculous meningitis; and shortly after her death a third high school girl was found afflicted with a pulmonary lesion.

Three of these patients had had either measles or pertussis during the year preceding the diag-

nosis of tuberculosis. Two of the three high school students had had productive coughs, and tubercle bacilli were demonstrated in their sputa. Two of them lived on farms from which cream was sent to the local creamery. Two delivered milk to customers of the village milk route.

These facts definitely indicated a greater incidence of the disease than had previously been suspected and suggested rigorous vigilance for the detection of other cases. It appeared necessary, immediately, first, to arrange a course of procedure for the certain detection of new cases, and, second, to adopt an epidemiological approach to the problem from every possible angle.

The definite routine set up to detect new cases is adjustable to any rural practice and is thorough enough to avoid failure of recognition of the disease, whatever the type or mode of onset. A detailed history is taken and a careful physical examination performed. When these two procedures arouse suspicion, the patient is asked to keep a daily temperature record with readings recorded every four hours, and is taught how to do it. Any rise above 99° F. in a male patient or 99.6° F. in a female one, or any variation of more than 1.5 degrees during the day, is considered, if persistent, corroborative evidence. Repeated sputum examinations are made. The von Pirquet tuberculin test is used as a routine, but where it leaves any doubt the Mantoux test is applied. All atypical childhood or adult cases of pneumonia are subjected to tuberculin tests. Whenever these tests show a positive reaction, X-ray plates of the chest are taken and are submitted to some recognized roentgenologist for interpretation. Basal metabolism tests are made and repeated as necessary. Tuberculosis is diagnosed only after the postulates of the National Tuberculosis Association are fulfilled. Each diagnosis made is confirmed by consultation.

Besides proving the diagnosis in the four cases already cited, this schedule led to the discovery of seven other cases: two of far-advanced adult apical lesions, one moderately advanced adult case, two basilar lesions (one with an acute and one with an insidious onset), one early infiltrative lesion in an adult, and one in-

*Presented before the Mississippi Valley Conference on Tuberculosis, St. Paul, September 21, 22 and 23, 1931.

filtrative lesion with an acute onset in a four-year-old child. Two of these cases presented some obscurity and diagnostic difficulty, and the diagnosis was not considered definitely established until confirmed by consultation.

These diagnostic procedures provided adequately for the discovery of new cases in practice, but the epidemiological features of the disease became more prominent with each new case. Partial postmortem examination in the first case mentioned revealed a far advanced lesion in the left upper lobe. There were six other children in this family, and the father and mother had been in poor health for months. The whole family had lived for years on a farm, and three years prior to their moving into the village one cow of their dairy herd had died of tuberculosis. Later, three other cows in this herd were found to be infected. Two of the children had had measles and two had had pertussis within six months of the death of their oldest sister. Also, it was known that the girl assisted in the delivery of the village milk supply.

The father was sent to the University Hospital, where it was determined that he was suffering from incipient bilateral tuberculosis. Von Pirquet tests, roentgenograms and continued observation demonstrated tuberculous lesions in three of the remaining children. In this way, from the discovery of five cases in one household, it became apparent that the entire family of each case must be studied, and this action was the first step in epidemiological control.

Skin tests followed by X-ray plates of those individuals with positive reactions failed to reveal, in the second case mentioned, any tuberculous disease or infection in the immediate family of the patient. However, two cases of the childhood type and one early adult lesion were found in the family of the sister of this patient. In each of the third and fourth cases cited and in another one subsequently observed a second member of the family was found affected. Thus, ten cases spread by family contact were demonstrated simply through cutaneous tuberculin tests, X-ray study, and observation.

Two individuals with active pulmonary tuberculosis were known at one time to be delivering milk on the village route. Substitutes were found for these workers. Also, to avoid continued dissemination in this way, it was necessary to see that all cows from which milk was

supplied to the village be tested and proved free from tuberculosis. Although two of them had been tuberculosis suspects two years before, testing of all the cows giving milk distributed in the town failed to show any positive reactors. One herd was tested twice within eight months to be doubly sure. As a safeguard for the future, the council adopted a resolution requiring annual testing of all cows giving milk for human consumption within the village.

In one family a possible relationship between bovine and human tuberculosis was indicated. Two of the cases mentioned were in farm families owning dairy cattle. So it seemed advisable to have all the cows owned by every family in which one or more members had the disease tested. This was done to ascertain further any possible relationship between human and bovine tuberculosis, as well as to avoid the possibility of continued dissemination through delivery of contaminated cream to the local creamery. One infected cow was found in the herd of a family in which were two cases of the childhood and one of the adult type. These three individuals, however, were related to and had associated with one previously mentioned suffering from active disease; so it was not considered that close inter-relationship between human and bovine tuberculosis had been demonstrated.

The answer to the creamery problem was arrived at, first, through an Area Test instituted by the county commissioners of Morrison County, and, secondly, through inquiries concerning pasteurization and distribution of creamery products. In August, 1930, 35 accredited veterinarians and two state and federal veterinarians, under the supervision of the State Livestock Sanitary Board, tested all cows in the county. They obtained these results:

Total number of cattle tested.....	54,493
Total number of herds tested.....	3,453
Total number of infected herds and suspects.....	192
Percentage of herds infected.....	5.5
Total number of negative cows in infected herds.....	3,589
Total number of reactors.....	572
Total number of suspects.....	33
Total number of cows under feeder-quarantine....	45
Percentage of infection found in the county.....	1.05

Retesting of suspects and cows under feeder-quarantine slightly increased the number of reactors and the percentage of infection. Seventeen cows in Morrison County and one in Todd County, adjoining, supplying cream to the local

creamery were found to be infected. All these animals were disposed of, so it could be concluded that the cream supply was not infective. It still remained possible that, during the time that cream from these infected cows had been delivered to the creamery, this institution had spread the disease unwittingly, milk, cream, butter, buttermilk and cheese having been sold there. But all of these products had been pasteurized, so it was not felt that the creamery could be considered a focus of dissemination.

In another way, also, the Area Test seemed to affect the problem. It was thought that tests of all members of the families of owners of cattle found tuberculous, might disclose more cases of human tuberculosis which were possibly dependent upon the bovine type. Three of the cases already described were in the family of an owner of one tuberculous cow. Two cases were found in which the family milk supply was partially obtained from two cows which had been tuberculosis suspects two years previously. Three families with tuberculous cattle refused to be tested. The other four families owning tuberculous cattle were tested and showed two positive reactors, but X-ray examinations proved tuberculous lesions absent in these individuals. It is hoped that the families of the owners of tuberculous cattle in more distant parts of the county will be tested and examined in the near future.

One month after the cattle test was completed, the health authorities of Little Falls suggested a plan whereby all high school students in the county could have the Mantoux test applied, if their parents wished it. The Morrison County Medical Society sanctioned the plan, and Dr. E. A. Leggett of Minneapolis did the work. Though there were 948 high school students in the county, only 608 tests were applied, and a few of these subjects were grade school students. Dr. Leggett has been kind enough to permit the use here of the results of her work, which are as follows:

Total number tested.....	608
Total number under 10 years of age tested.....	29
Total number over 10 years of age tested.....	579
Those reacting positively to 0.1 mg. of O. T.....	58
Those reacting positively to 1.0 mg. of O. T.....	62
Total positive reactors under 10 years of age.....	0
Total positive reactors over 10 years of age.....	120
Highest percentage positive reactors in any group....	29
Lowest percentage positive reactors in any group....	5.7
Percentage of reactors in entire group.....	19.7

Of the 608 tests applied, 120 (19.7 per cent) showed a positive reaction. Only 118 of these suspects permitted X-ray study. Interpretation of the plates by Dr. J. A. Myers, president of the Minnesota Public Health Association, and Dr. H. A. Burns, superintendent of the State Tuberculosis Sanatorium, revealed tuberculous lesions in fifty-nine cases. Of these fifty-nine, thirty-four showed frank, unquestioned lesions, while in twenty-five the status of the lesion was somewhat doubtful. In the clinic which followed the tests and X-ray work, forty-nine cases were found with demonstrable lesions, or else were sufficiently suspicious to require further observation. Even if the latter figure is considered as the correct number of cases—and from every point of view this is the most conservative figure tenable—the work proves an incidence of tuberculosis of 8 per cent. It should be borne in mind that all of these were persons who had been believed to be well and healthy. All of them had become infected from some unknown source and each of them was or could be a potential focus of dissemination.

The work done by Dr. Leggett embraced insofar as possible only the high schools of the county. Nine of the cases found in practice had attended either the local high school or the grade school. Other cases in the series were from small surrounding villages; so, as an extension of Dr. Leggett's work, it was decided to apply the Mantoux test on as many as possible of the grade school pupils in the four neighboring communities of Swanville. After the proposed program was sanctioned by one of the state health organizations, cards were sent to the parents, requesting their permission to perform the test.

As a result, 264 Mantoux tests were applied. Of these children, thirty-nine showed positive reactions. X-ray plates were taken of the chests of twenty-eight of these reactors, and the plates were interpreted by Dr. Malcolm Hanson of the Roentgenology Department of the Lymanhurst School for Tuberculous Children. Thus, tuberculous lesions were shown in two cases, indicating an incidence of infection of 0.75 per cent of all tested, or 7.14 per cent of those reacting positively who had X-rays taken.

In addition to these tests, thirty-three von Pirquet tests were applied in routine practice. Including fifteen other cases of tuberculosis with positive von Pirquet tests, a total of forty-eight

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von Pirquet tests has been performed. Among these, thirty-four were positive, and seventeen of the positive subjects disclosed tuberculous lesions in the roentgenograms. These cases would naturally show a high percentage of infection, for in most instances they presented some of the cardinal symptoms of the disease.

It has been difficult to investigate the entire families of each of the students who, through the diagnostic campaigns described, were found to have tuberculous infections. Undoubtedly such a procedure would disclose more cases and would prevent further spread of the disease. This would be the last step in the study of the epidemiology of tuberculosis in Morrison County, though it is not the last work which should be done for the detection of the disease.

A summary of the work shows a total of twenty-three cases of pulmonary tuberculosis encountered in 18 months of rural practice. Seven cases were found to follow measles, and two following pertussis. Of the twenty-three cases, twelve were of the adult type, nine of the childhood type and two showed both kinds of lesions. Eleven of them were identified through adherence to a definite diagnostic schedule. Twelve were found by investigating the epidemiologic aspect of the cases found in routine practice. Eight cases were found in which the milk supply was obtained from tuberculous cattle; and two, with a milk supply from cows considered tuberculosis suspects. Twelve cases had tuberculous associates. Two hundred and sixty-four Mantoux tests were performed on grade school

children, showing thirty-nine positive reactors and two cases with lesions demonstrable by X-ray. Forty-eight von Pirquet tests were performed, showing thirty-four positive reactors and seventeen cases with demonstrable lesions.

The following conclusions might be drawn:

1. As demonstrated by the facts that twenty-three cases of pulmonary tuberculosis were found in a limited rural practice within 18 months, that through the tuberculin testing of 608 high school students in one county, at least forty-nine individuals previously believed to be healthy were found to have tuberculous lesions, rural districts are promising fields for the continued fight against tuberculosis and its still excessive mortality rate.

2. If the first conclusion can be considered of any significance, every available means must be used to stimulate the interest and coöperation of rural practitioners in the fight against the disease. For the accomplishment of this objective, one of the most effective methods is the frequent repetition of a routine schedule for diagnosis available to every country practitioner and thorough enough to prove unfailingly every case of tuberculosis encountered.

The results to date of this attempt to control the disease in Morrison County could not have been obtained without the generous coöperation of Dr. Myers, Dr. Burns, Dr. Hanson and Dr. Leggett. I should like to express my appreciation to them, and to Dr. Herman Hilleboe and Dr. John Simons, for their kind assistance.

VARICOSE VEINS: SOME SPECIAL CONSIDERATIONS IN TREATMENT

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DURING the past two years, while assisting the American Medical Association Committee on Varicose Veins in conducting their clinics at the convention sessions, certain questions were repeatedly asked me by the attending physicians. In the order of their frequency, they were as follows: (1) What is the best solution to use? (2) What is the best technic? (3) How do you treat ulcers? (4) What is the best method of handling sloughs? (5) Should pregnant women be given injections? These same questions have also been most frequently encountered in conducting local clinics, especially during the past year. It is the purpose of this paper to answer these questions as accurately and completely as possible.

1. *What is the best solution to use?* This question has become more difficult to answer each year because new solutions are constantly appearing on the market which are claimed to remedy the faults of the old ones.

Bichloride of mercury, first used by Linser¹ to obliterate veins, is little used now because of its toxicity and the severe sloughing produced if some is accidentally injected outside the vein. Only one injection can be given at a visit and the small amount injected (1 c.c. of a 1 per cent solution being the maximum dose) results in only slight sclerosis, so that many injections and visits to the office are required. The same objections apply to red iodide of mercury, mercury cyanide and metaphen (the latter, however, can be safely given in doses up to 8 c.c., according to Schussler²).

Sodium chloride and sodium salicylate, in 20 to 40 per cent solution, were used in Europe for years, the former by Linser³ and the latter by Sicard⁴ and Forestier in Paris. Although they are still used routinely in this country in certain charity clinics, chiefly because of their low cost, most physicians have discarded them in their private practice as they produce severe pain immediately following injection, severe sloughing if injected outside a vein, and frequent "perivenitis."⁵ Also, an occasional individual has

an idiosyncrasy to salicylates. I use them only in "intima resistant"⁶ cases and in recurrences.

Sugar solutions have been used since 1923 in the forms of glucose and invert sugar. They cause little or no pain, are non-toxic and result only in a painful, indurated area *without sloughing* if injected *outside* of a vein. Invert sugar solutions were preferred by Nobl⁷ because of their decreased viscosity compared with glucose, allowing them to be easily injected in strengths of 60 and 70 per cent through a 20 gage needle.

During the past year or two, combinations of sugar solutions with sodium chloride or sodium salicylate have become very popular. The salts increase the irritant action on the intima, resulting in a firmer and higher percentage of sclerosis. The "edge" of the painful cramp is "taken off" by the addition of 1 per cent phenyl carbinol or some similar local anesthetic.

Quinine-urethane solution in 2 to 4 c.c. dosage has been advocated by Genevrier and Douthwaite⁸ of England, and has been tried by many men in this country. Its chief objections are its toxicity frequently causing severe general reactions, *sloughing* if injected outside the vein, and its *small maximum dose*.

In order to determine the merits and faults of the most popular solutions, I made a careful study of their action in the same and different cases, giving at least 200 injections with each solution in some 600 different patients. The various angles studied, with the results obtained, are given in Chart 1.

Although a carefully standardized technic was used, developed after experience with more than 15,000 injections, failure to obtain a sclerosis occasionally resulted with all of the solutions. Several times with each preparation, where some solution was accidentally injected perivascularly, dilution with normal saline was omitted in order to see if a slough would appear. Unfortunately it did appear with all solutions except plain invert sugar, mercuric chloride proving the most toxic and causing a slough in two instances even after being well diluted with normal saline.

The combination of invert sugar (60 per cent) and sodium salicylate (15 per cent) seemed to be the most effective except for a rather high percentage of resulting perivenitis and a very occasional idiosyncrasy.

The combination of invert sugar and sodium chloride with some substance such as phenyl carbinol added to act as a local anesthetic and to prevent some of the usual pain, was almost as effective in producing firm sclerosis, and had a lower percentage of perivenitis.

Quinine-urethane is altogether too toxic to be used routinely. In addition to nine severe reactions and many mild ones, I had one patient who almost died after a 2 c.c. injection. Within thirty seconds after the solution entered the vein, she began to have labored respirations, cyanosis, drop in blood pressure, weak, rapid pulse, and finally delirium which was severe for six hours and did not entirely disappear for twenty-four hours. The patient had to be removed from my office to the hospital in an ambulance, where she had to remain for two days. She said she did not feel herself again for two weeks. One should always be on the lookout for these sensitive patients and never give more than

0.5 c.c. the first time and increase by only 0.5 c.c. up to 2 c.c. at a sitting.

The use of invert sugar alone seems to be limited to small veins, as failure of closure was comparatively high in the larger veins. It is an ideal solution to use here, however.

Mercuric chloride is quite toxic both systemically and locally and should be used only in patients with idiosyncrasy to salicylates and quinine-urethane, and where sugar solutions alone or in combination cause severe cramps. One must also be sure the kidneys are normal before using this mercurial.

It is difficult to select a solution that can be satisfactorily used in all cases. I have concluded from my own experience and that of some others, that the best solution to use routinely is a combination of invert sugar with sodium chloride or sodium salicylate, preferably the former. The ones I use and prefer are varichlorose and invertose compound. They can be used safely in all sizes and types of veins with a high percentage of closures if careful technic is observed. It is non-toxic, so that comparatively large amounts can be injected at one sitting (20 to 40 c.c.). If some is accidentally injected outside the vein, it

CHART 1. RESULTS OF CLINICAL EXPERIENCE WITH VARIOUS SCLEROSING SOLUTIONS

Solution	Invert Sugar† 50-70%	Invert Sugar and Sod. Sal.‡	Sodium Salicylate 20-40%	Dextrose and Sodium Chloride	Vari-chlorose*	Quinine-Urethane	Mercuric Chloride
Number of injections	600	600	600	200	200	400	200
Percentage of failure of sclerosis	5.3	1.5	0.5	3.5	2.3	1.2	4.2
Percentage of perivenitis	2.1	8.1	3.9	4	2.8	5.2	1.1
Number of sloughs	0	2 s	3 m	3 m	2 m	4 s	2 VS
Percentage of reactions S S	0 0	1.1 0	1.2 0	1.5 0	1 0	many 9	0.5 0
Pain	0 or s	s or m	s or m	s, m, or S	s, m or S	s or m	0
Percentage of soft clots	1	0	0	0.7	0.3	0.8	0.9
Percentage of jumped closures	1	1.5	0.5	1.5	1.2	0.5	0.5

0, none; s, slight; m, moderate; S, strong or severe; VS, very strong or severe.

*Invertose: 50-70% indicates invert sugar content by weight.

†Invertose Cpd: Invert sugar 60% (by weight); sodium salicylate 10% (by weight).

*Varichlorose: Invert sugar 3.5 in 10 c.c.; cane sugar 2.5%; sodium chloride 1.5 in 10 c.c.; phenyl carbinol 0.86%. The above formula furnished by Ulmer Laboratories, Minneapolis, Minn.

can be easily diluted five to ten times with normal saline or the patient's blood, and thus any possibility of sloughing can be prevented. In cases of diabetes, its carbohydrate value can be allowed for in the diet. If an individual is especially subject to cramps, small amounts (2 to 5 c.c.) of the solution can be used, which will usually not produce cramps or will reduce them to a minimum. Percentage of perivenitis following its use is low, and general reactions are very rare.

For the past year I have been using this combined solution routinely with great satisfaction, having now had experience in some 5,000 injections. Occasionally I find a patient who is very sensitive to cramps and does not stand pain well, and here I try plain invert sugar (50 to 70 per cent), quinine-urethane, bichloride (0.5 per cent), or small doses (2 to 3 c.c.) of 20 per cent sodium salicylate, provided the patient has no idiosyncrasy to them. It may be best to use one of the latter solutions in diabetics also. In small veins, especially the tiny, dilated varicosi-

ties of the precapillary veins, I find that plain invert sugar solution (50 per cent) works nicely. Stronger solutions such as quinine-urethane, bichloride or sodium salicylate (20 to 40 per cent) will often produce a slough even though injected intravenously in these tiny veins.

In case of recurrences, where canalization has occurred in a previously sclerosed vein, I find the wall of the vein usually thickened and the intima more resistant than before. Stronger solutions, such as sodium chloride or sodium salicylate (20 to 40 per cent), quinine-urethane or 1 per cent bichloride must and should be used in these cases. I prefer the 20 to 40 per cent sodium salicylate solution as I have found it less painful than the sodium chloride, can be given in larger amounts than quinine-urethane or bichloride, and I have obtained a sclerosis more easily with it than with any of the others. Occasionally one runs into a very stubborn case where the intima is very resistant. Here it is necessary to use very careful technic and re-

CHART 2. TYPE AND AMOUNT OF SOLUTIONS USED FOR INJECTION*

Solution	Maximal amount at one injection—c.c.	Advantages	Disadvantages	Indications for use
1. 15-50% sodium chloride	10	Nontoxic; prompt action	Marked cramping; danger of necrosis	In large, thick veins; preferable in combination with dextrose
2. 50% dextrose	20	Nontoxic; no slough; slight cramping	Not irritating enough for larger veins	For smaller, thin walled veins
3. 30% sodium chloride and 50% dextrose, equal parts	10	Nontoxic; prompt action	Marked cramping; necrosis if large amounts are injected beside the vein	Generally useful; combines the advantage and reduces the disadvantage of solutions 1 and 2
4. 50-75% invert sugar	10 or more	Nontoxic; slight cramping; no slough	Not irritating enough for larger veins	Best for smaller thin walled veins
5. 30% sodium chloride, 60% invert sugar, 1% phenyl carbinol	10-30	Nontoxic; slight cramping	Moderate cramping; necrosis if large amounts are injected outside vein	Generally useful; best solution for routine use. Combines advantages and reduces disadvantages of solutions 1 and 2
6. 20-40% sodium salicylate	5-10	Prompt action	Painful if more than 4 c.c. injected; danger of necrosis, salicylism	Generally useful with caution, best for resistant varices
7. 10% quinine with urethane	2	Prompt action; painless	Cinchonism; <i>anaphylactoid</i> reactions; danger of necrosis	Resistant varices; test for individual susceptibility
8. Sodium morrhuate	1	Nontoxic; rapid action, slight danger of slough	Marked cramping; and periphlebitis	Resistant varices; when quinine cannot be used

*After outline of A. M. A. Committee on Varicose Veins.

inject the vein every other day until sclerosis results. In one case I had to give five injections in the same vein before sclerosis was obtained.

There are some other solutions on the market which are more rarely used and not included in this study. I have listed them in Chart 2.

2. *What is the best technic?* This is a very difficult question to answer as many very good men obtain excellent results with very different technic. A physician attending the varicose vein clinic at the convention booth of the American Medical Association in Philadelphia told me that he watched five different doctors demonstrate, and all used a different technic. I told him I felt this was an advantage to him as he should be able to work out a technic for himself containing all the good points of the various demonstrations. Some men prefer to have their patients standing, others sitting, during the injection. I prefer to have my patients lying down as it makes emptying of the veins easier, and thus prevents dilution of the injecting fluid. The main thing is to get the solution in contact with the intima of the varix with the least dilution by the blood. My own technic, which I have used successfully in over 20,000 injections, is as follows: While the patient stands erect so as to distend the veins, the point of injection is selected and marked with 1 per cent mercurochrome. A rubber tourniquet is now applied well above this point. The patient then sits on a table with an adjustable leg-rest, the latter being at 45 degrees. The skin is sterilized as for any intravenous injection. A sharp sterile needle, 18 to 24 gage, according to the size of the varix, attached to a sterile glass Luer or Vim syringe filled with the solution at body temperature, is carefully inserted into the marked varix. Blood is aspirated to be sure the needle is well within the vein. The adjustable leg-rest is now raised to a horizontal position or 90 degrees. The patient carefully lies down without moving the leg. The tourniquet is now removed, relieving the distention. The assistant with index fingers now carefully "milks" the remaining blood from a section of the varix for a distance of a few centimeters above and below the needle, being careful not to disturb the latter. After assuring myself that the needle is still in the vein, I inject the solution rapidly enough to produce slight distention. I keep the index finger of my left hand over the point of the needle so I

always know where it is, and can quickly feel any solution going outside the vein. The fingers of the assistant and the needle are kept in place for five minutes after the injection is completed. Upon removing the needle I apply a sterile gauze pressure pad with adhesive strips at the needle site. If the veins are large and prominent, I apply a larger non-sterile pressure pad over the section of the vein four to five inches above and below the point of injection and hold it in place with a rubber elastic bandage applied from ankle to thigh. This is kept on for two to three weeks, and removed only during the subsequent injections, which can be given bi- or tri-weekly. This allows the veins to become sclerosed in a collapsed state and produces a quicker cosmetic result. The patient is instructed to get up and go about his duties as usual in order to attain the best results.

Twenty-four to forty-eight hours after an injection one of the following results may be expected: (1) no sclerosis; (2) thickening of the vein wall without obliteration of the lumen; (3) complete sclerosis and obliteration of the vein lumen resulting in a tender fibrous cord; (4) same as (3) with perivenitis (described later). Repeated injection at the same point with stronger solutions must be made if the first two results occur.

In case of perivenitis, I suspend further injection in that leg for a few days, instructing the patient to use large, hot, wet, 25 per cent magnesium sulphate packs around that portion of the leg, as continuously as possible.

Of the various technics used, injection between the double tourniquet applied to the leg is the least desirable, to my way of thinking. Any excess of solution injected after the vein between the tourniquets is filled, is forced through the connecting into the deep veins. If large amounts are being injected by this method, there is danger of irritating the intima of the deep veins enough to cause sclerosis, especially if one should happen to be dealing with one of those cases in which the intima is hypersensitive.

In addition, I mention some general rules to follow which I have found very worth while. Large varices, especially if long, should first be injected near their lowest point and so closed from below upward. Clumps, plexuses or masses of large varices usually found over the calf of the leg are prone to develop perivenitis, so strong

caustic solutions should be avoided, especially in large amounts. Sugar solutions are safest. In these plexuses an iron ring, two or three inches in diameter, may be pressed firmly around the point of puncture to keep the solution from escaping. It is hard to prophesy how a vein will sclerose, as some large veins close extensively from injections of mild solutions, while some small veins may need repeated injections of increasing concentration at the same point. It is safest to start with weak solutions.

It is safest not to give more than two injections at a sitting, that is, one in each leg. The literature shows that many of the cases of reported emboli followed where many injections were given at one sitting (Meisen⁹).

Nonsclerosis is due to poor technic, or increased resistance of the intima to the irritating effects of the sclerosing agent, an individual characteristic.

A slough may be expected in all cases where extravenous injection has occurred, except when plain sugar solutions are used. The solution in the tissues should be liberally diluted by injecting normal saline or the patient's blood, the area massaged for five or ten minutes, and a hot water bag applied for an hour or two.

The patency of the deep veins should be tested in suspicious cases by the Trendelenburg, Perthe and Pratt methods before injecting. Where the deep veins are closed, injections should never be carried out.

This form of treatment is probably inadvisable in cases of hard chronic edema or elephantiasis. These patients should be carefully studied for heart or kidney deficiency, and other vascular diseases of the extremities.

3. *How do you treat varicose ulcers?* This is certainly an appropriate and timely question, for what can be more painful and disabling than an inflamed, infected varicose ulcer? The first thing is to be sure you are dealing with a varicose ulcer, and not one due to syphilis, tuberculosis, or a mycotic infection. All varicose ulcers have varicose veins leading to them. These veins may enter from almost any side or merely run under the ulcer. They cause an abnormal circulation due to venous stasis resulting in a poorly distributed supply of oxygen to the extremity, especially the skin. Usually the reverse flow of blood in these varicosities results in an increased pressure within the veins greater

than that in the arterial capillaries, as shown by Wright,¹⁰ resulting in marked venous stagnation. This causes phlebitis, periostitis and eczema, as well as ulcers. Thrombosis, as the result of trauma or phlebitis, cuts off the circulation to an area of the skin which dies, sloughs out, and the ulcer appears. Secondary infection may now enter as an aggravating factor. It is obvious that in order to heal a varicose ulcer, *the cause*, venous stasis, must be removed. The old method was to put the patient to bed and elevate the affected limb, or remove the guilty veins by operation. This involved considerable expense, introduced an economic factor and the bed rest was not good for elderly individuals, in whom these ulcers are so common.

There are two ambulatory methods which accomplish the same result, namely, remove venous stasis. The first is injection and sclerosis of all varicose veins causing the venous stasis. If there is much inflammation, or infection about the ulcer with edema of the extremity, this cannot always be done at first. It is unwise to inject veins in an inflamed area. Where there is edema, or where the "guilty" veins lie deep under the ulcer or in the muscles, they cannot be seen and are difficult to find. Here the second method is especially applicable, namely, the use of compression to get rid of venous stasis and edema. This is accomplished by Nobl's pressure sponge,¹¹ or adhesive bandage. Where the ulcer is comparatively small and there is not much inflammation around it or edema of the extremity, I prefer Nobl's sponge. It consists of placing several layers of sterile gauze over the ulcer, large enough to project beyond the edge of the sponge. An ordinary good grade of rubber bath sponge is used, large enough to project an inch beyond the margin of the ulcer, and is placed on top of the gauze. The gauze can be strapped on with a couple of strips of adhesive to keep it from slipping. Any good type of elastic bandage is now applied, starting under the foot and winding upwards over the sponge, tight enough to compress the sponge to one-half of its former thickness, and then carried on up to the knee. A five yard length is usually necessary. The patient may now go on about his business. Walking on the leg thus bandaged will add a pumping effect to the existing compression effect of the sponge in ridding the underlying tissue of venous stasis. It may cause

additional pain the first few hours, but as the venous congestion is diminished the pain leaves. The bandage is not removed until the patient returns in two or three days. Then the outer dressings are removed, letting the under layer of gauze next to the ulcer remain. Ten to 25 per cent silver nitrate is applied through this layer and clean gauze again added. An injection into one of the causative varicose veins can now be given before the sponge and elastic bandage are replaced. This method is repeated until all the varicose veins are injected and the ulcer healed. The sponge can then be discarded but the bandage worn for three or four more weeks. It is surprising how rapidly an ulcer will heal by this method.

When the ulcers are multiple, large and irregular, or when much edema or hard induration is present in the leg, or when associated with arteriovenous fistula, I prefer the adhesive compression bandage. It abolishes the venous stasis, diminishes the edema, reduces the size of the leg and the ulcer before any healing begins. It approximates the edges of the ulcer and presses down the margins to make it flat and relieves pain, just as the rubber sponge does. The result is that the ulcer heals rapidly beneath it. It allows the patient to be ambulatory throughout the treatment.

The technic is simple: Merely take any good grade elastic adhesive bandage and apply it from ankle to knee, overlapping one-half the width on each turn, with as much compression as the patient can comfortably stand. If there is much edema present, have the patient lie down with leg elevated until most of the edema has disappeared before applying the bandage. Reapply a new bandage every week or ten days until the ulcers are healed. Where the discharge is very profuse, I often cut a window in the bandage over the ulcer and use a rubber bath sponge as described above. This combined method has proved very helpful in certain cases. When changing the elastic bandage many varicose veins can often be seen which were hidden in edema before, and can now be injected. If irritation to the skin with eczema develops, substitute an Unna's paste cast for the adhesive bandage a few times. Wright¹⁰ claims that by the use of the adhesive bandage alone any ulcer will heal at the rate of one square inch per week. If granulation tissue is slow in forming it can be

hastened by applying constant wet dressings of thiocresol (sulphen), alternating with normal saline as described by Reimann.¹²

4. *What is the best method of handling sloughs?* Of course, being sure the point of the needle enters the vein lumen and remains within it throughout the injection will prevent sloughing. If any irritant solution is accidentally injected outside the lumen of a vein, it should be diluted at once by injecting the patient's blood or normal saline into the area in the proportion of ten parts of the diluent to one part of the irritant. Novocain (one-half per cent) can be added to the normal saline to take out its "sting" when injected. If large amounts of the irritant are injected extravenously, or if the accident occurs in areas with poor circulation, such as about the ankle or in fatty tissue, a second injection of the diluent should be made about an hour later. I usually inject one-half the amount of the diluent, massage this in for five or ten minutes, and then inject the remainder. If in doubt as to whether some of the irritant was injected extravenously, always inject the diluent. If the patient complains of burning during the injection, suspect that some of the solution is going outside the vein. If you can see or feel ballooning out of the skin with blanching about the site of the injection, you can be sure that some of the sclerosing or irritant solution has gone outside the vein. After injecting the diluent, apply a loose bandage over the area. Instruct the patient to apply heat here for several hours upon arriving home. Have him return in one or two days if possible. If the skin over the area of infiltration is intact and of normal color, spontaneous absorption will take place. If a hard, poorly demarcated mass is found covered with red, glossy skin which breaks on slight pressure, a slough is almost sure to develop. One can continue with the heat and apply mercury ointment, but if the mass refuses to absorb, and a necrotic area becomes clearly defined, excision should be advised. Do not wait until a gangrenous ulcer develops with the accompanying danger of secondary infection. If the excision is extended to the normal tissue, primary union usually results. Kilbourne¹³ advises against early excision for fear of opening lymphatics and thus allowing spread of infection. He prefers late excision.

If the slough is small or the patient refuses

excision, the gangrenous ulcer should be painted daily with a solution of gentian violet and acetone in alcohol (formula by Kilbourne¹³). I have found this reliable in preventing secondary infection. Hot, wet packs of Dakin's solution should be applied frequently each day to improve the circulation to the area and remove the necrotic material. Infra-red and ultra-violet rays aid in the same way. Sulphen solution applied as described before will hasten the formation of granulation tissue. The adhesive elastic bandage can be used in the "ulcer stage." Expect healing to be very slow with a resulting scar which is prone to contract and often become ugly.

5. *Should pregnant women be given injections?* This is a question about which very little has appeared in the literature. Most writers merely state that it is one of the contraindications to the injection treatment. This is true in Europe as well as this country. When I visited clinics abroad in 1926-27, injections were not being given to pregnant women. I understand this has been somewhat modified now. My policy up to two years ago was to use merely supportive measures, such as elastic bandages or Unna's paste casts on these patients. However, one day I had a patient referred to me by an obstetrician because of very painful varicosities about the labia majora and minora. On examination I found them to be quite large, one about the size of one's thumb. Supportive measures were of no avail here. The patient begged for relief, so I decided to inject 10 c.c. of plain 60 per cent invert sugar solution. The solution was kept in the veins for about five minutes by using pressure with an ordinary iron ring around the site of the injection. A nice non-painful sclerosis resulted. Further necessary injections were given to sclerose all the veins. The patient got complete relief from her former pain and was very grateful and happy. Since this time I have not hesitated to inject varicose veins in pregnant women, with certain restrictions, however. They are as follows: (1) Only those cases in which the varicose veins are painful or appear to be leading to the formation of an ulcer are injected. Only the painful veins are injected, as most of the apparent varicosities will disappear after the back pressure from the enlarged uterus is relieved. (2) Mild solutions, preferably invert sugar, 50 to 60 per cent, alone

or in combination with sodium chloride are used. Solutions that produce severe pain or toxic solutions, especially those containing quinine, are avoided. (3) One injection is given at a sitting so the formation of a perivenitis is less likely, which, if extensive, may indirectly cause a miscarriage. No injections should be given after the seventh month of gestation. This is usually unnecessary as most painful varices appear before this time and should be injected then. Those varices that first appear after the seventh month are certainly entirely the result of mechanical pressure and will usually disappear after delivery. Supportive measures such as elastic stockings, adhesive bandages or Unna's paste casts may be used in these cases. (4) Varicose ulcers appearing during pregnancy should be treated the same as at other times. Only the veins causing or "feeding" the ulcer need be injected. Supportive measures as already described should then be used until delivery. (5) After delivery the remaining varicose veins can be injected. It is well to wait a month or two, or longer if they give no symptoms, before starting the injections. Contra-indications are the same as in ordinary cases, both before and after delivery.

Conclusion.—Each year new and valuable information derived from experience and scientific experimentation is appearing in the literature regarding the injection treatment of varicose veins. Five special points in treatment have been dealt with briefly, questions which seem to be uppermost in the minds of practitioners desiring to learn the treatment of varicose veins and complications.

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PATHOLOGY OF PULMONARY TUBERCULOSIS

The pathology of pulmonary tuberculosis is difficult to understand because a complex terminology has been created to "pigeon-hole" certain gross appearances of the tuberculous lung. Our mental pictures of tuberculosis pathology would be clarified were we to disregard the terminology in vogue at present and in its place interpret the whole process on the basis of inflammation and repair. All stages from acute inflammation to advanced repair may be found in different portions of one tuberculous focus. Such are the conclusions of Medlar and Sasano, who studied the pathology of pulmonary tuberculosis in successive stages in animals. Extracts from the article follow.

Tuberculosis is often set aside as a disease of distinctive pathology. It is probably true that there is some chemical specificity in tuberculous infection but morphologically the lesions represent biological reactions corresponding to those of inflammation and repair observed in infectious diseases generally. Under certain conditions, for example, tubercle bacilli may incite abscess formation and under other conditions tubercle formation. Such terms as "proliferative type," "exudative type," "caseous pneumonia," "chronic fibroid phthisis," cause confusion. They do not represent "specific" lesions, but merely stages, combinations of lesions, or appearances in the course of pathological development.

The authors studied pathological changes produced in rabbits by a very virulent strain of a bovine tubercle bacillus, whose characteristics were known by previous studies. By varying the dosage of bacilli it was possible to control in a large measure the number of tuberculous lesions. As nearly as possible all other factors were controlled.

Pulmonary tuberculosis in the rabbit differs in some

respects from the disease in human beings, but doubtless the fundamental pathological principles are the same in both species. Probably the chief reason for the differences observed in the rabbit and man, is that in man previous contact with tubercle bacilli has developed some resistance to the infection, whereas the experimental animals experienced their first contact with the bacilli on the day they were inoculated. Another factor is that the rabbits were given a single injection, which contained far more tubercle bacilli than any person would inhale or ingest at a single exposure to infection.

Forty rabbits were uniformly inoculated and killed at different periods. Numerous blocks of tissue were then studied microscopically.

CONCLUSIONS

1. Massive pulmonary tuberculosis in the rabbit is dependent upon the rupture of pulmonary tuberculous abscesses into the bronchial tree and inhalation of the contents of these abscesses into the previously uninvolved lung tissue. It seems plausible that this is also the method of extensive dissemination of tuberculosis within the human lung.
 2. The pathology of pulmonary tuberculosis is essentially a process of inflammation and repair. Interpreted upon the basis of inflammation and repair the complex pathology becomes greatly simplified and more easily understood.
 3. The complex terminology used to describe the bizarre pathology of pulmonary tuberculosis is unnecessary and confusing.
 4. The term "specific" when used in connection with tuberculous lesions should be restricted to denote a biochemical, not a morphological specificity.
- An Interpretation of the Pathology of Pulmonary Tuberculosis, E. M. Medlar and K. T. Sasano, Am. Rev. of Tuberc., Dec., 1931, as cited in Tuberculosis Abstracts, March, 1932.*

POSTOPERATIVE CARE OF RECTAL AND ANAL CASES

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FROM the moment rectal or anal surgical patients are put in bed after the operative work is completed until their wounds are healed constitutes an important time, concerning which most patients have no little bit of fear. They have heard stories of severe postoperative suffering from persons who have undergone similar operations in the past; it reflects no credit upon the medical profession to have patients state that were it not for the pain they have understood such surgery entails they would have been in for treatment long before. Moreover, the frequency with which anal and rectal operative cases require subsequent reoperation may oftentimes be laid to inappropriate or neglected postoperative care.

After any anal surgery, it is well to keep hot packs to the wound as soon as the anesthesia has cleared off sufficiently to let the patient be conscious of the fact if the packs are hot enough to burn. I leave specific instructions with the nurse to apply a boric acid pack at 110° F. as soon as the anesthesia is gone and to change this pack with a fresh one hourly. It is well to keep these patients lying on their side with a pillow maintaining the hot pack in position. A change from one side to the other as the pack is changed each hour keeps their hips comfortable. The hot packs keep edema in the operative area at a minimum and tend to keep down postoperative pain by allaying spasm in the anal sphincter. Six hours of the hot pack per day is enough and this is cut down over the course of four or five days.

One of the advantages of the preoperative administration of nembutal is the long and restful sleep these patients obtain after their anesthesia has left them. Any patient experiencing any real pain is given from one sixth to one quarter grain of morphine hypodermically. Usually after the first day any pain they may have is effectively controlled by one grain of codein sulphate and ten of aspirin.

Some ten per cent of patients will have to be catheterized one or more times after such surgery. It is not advisable to allow them to go more than twelve hours without voiding although as

the bladder becomes distended if an orderly or nurse will assist the patient in standing erect many catheterizations may be avoided. Patients who continue having trouble voiding are put in a hot sitz bath for twenty minutes.

At the end of forty-eight hours the patient is taken into a dressing room and under good light and ample exposure the iodoform gauze and gutta percha drain left in the anal canal at the time of the operation are gently removed. The manner in which this is done and the care exercised in loosening these dressings makes this first dressing either a nightmare or an incident. The anal canal is irrigated with some mild antiseptic such as boric acid or pure witch hazel so that the field is mechanically well flushed out. For this I use a metal tube three and one half inches long and three-eighths inch in diameter which has many small perforations throughout the distal two-thirds and has a short piece of rubber tube attached to the other end. Through this the irrigating fluid is forcibly injected. A piece of gauze is held about the anus as the fluid is injected so that any overflow may be absorbed. Mercurochrome on an applicator is gently painted over the open wound and one of the anesthetic powders supplied commercially is sprinkled about on the wound. Within a few moments the pain incidental to removing the dressing has left and the patient is comfortable again. A small piece of absorbent cotton is left tucked into the anal canal and the patient is instructed to change this with a dry piece every hour or often enough to keep the wound dry.

The first dressing having been accomplished, the worst part of the ordeal for the patient is over. He is now told he may allow his bowels to move. Usually this is all that is necessary. However, should he not have had a stool by the next day a small warm soapy enema is given. At this point in the patient's convalescence he is educated in giving himself an anal irrigation and is told to carry out this irrigation after each and every bowel movement. He is given a fountain syringe with an 18F catheter attached to the hose containing four ounces of water at 110° F. and

shown how to put the catheter tip just inside the lower end of his anal canal. In this manner the water will not enter the rectum to act as an enema but will simply wash out the anal canal and provide a clean wound. These people are advised to either lie down or stand up, as sitting seems to definitely slow up the healing process.

The patient who has been on a soft diet until now is put on a full general diet and encouraged to eat. In the event that they had been troubled by constipation prior to their operation, the diet is of an anti-constipation type and dry agar may be added if the diet alone is insufficient to provide one or two formed stools each day. No effort is made to inject oil into the rectum or give mineral oil orally for the purpose of keeping the stool soft or liquid. The formed stool is the best dilator the anal canal can have and it is a mistake to sacrifice this dilating effect on the anal canal for the temporary comfort obtained by the soft stool.

Dressings subsequent to the first day are carried out much in the same manner as the first one. Other antiseptic agents such as dichloramine T solution in oil or hexamethylenamine or metaphen may be used instead of mercurochrome, depending on how much superficial infection the wound shows the first few days. The anesthetic powder may be dispensed with after the first few dressings and if the wound shows considerable secretion some dry absorbent powder as thymol iodide may be used.

Perhaps the most important thing that daily attention to the wound affords is the observation of the manner in which healing is taking place. Sulci in hemorrhoidectomy wounds must be kept open and draining externally lest they close over

and an abscess form underneath; fistulectomy wounds must be kept clean and dry, but no packing left between the cut ends of the sphincters; mucous membrane must be kept from bridging across to form pockets, and granulation tissue must be kept down flat with the skin margins rather than allowed to pile up in a thick tuft. It is well to insert a finger into the anal canal frequently to make sure that the healing process is not encroaching on the caliber of the anal canal.

After healing is complete and the patient ready for discharge, advise him to keep on with the hot irrigations after bowel movement and to keep the cotton tucked in the anal canal for another three weeks. Oftentimes although the wound has healed across, a large or hard stool will rupture the thin, newly healed wound, and if anal cleanliness is not observed, infection will keep the wound open and cause all the good work up to this time to be undone.

The customary hospitalization period varies from four to seven days, at the end of which patients have been up and about long enough to feel strong again, and they have been educated in the care of their wound after they leave the hospital. An average period of three weeks has been found to be the customary time required for the simple anal wound to heal. Large fistulectomy wounds, many pilonidal cyst excisions and any complicated wound will extend the postoperative period in proportion to the size of the wound or the handicap which any complication may place upon healing.

Observation of many of these wounds has convinced me that adequate attention postoperatively makes for greater comfort and a shorter period of convalescence, as well as better end-results.

CASE REPORT

SPONTANEOUS PNEUMOTHORAX*

ARTHUR A. WOHLRABE, M.D., F.A.C.P.
Minneapolis

Spontaneous pneumothorax is defined as the presence of air in the pleural cavity due to internal causes and not introduced by artificial or accidental means. The term was coined in 1803, by Itard, who found this condition in necropsies of patients who had died of tuberculosis.

Laennec, the inventor of the stethoscope, first recognized pneumothorax during life.

In a study of respiration in patients with pneumothorax Means and Baldwin found that one lung will do the work of two until three times the normal area-tion is called for. The condition is similar to that of a diseased heart which is compensated up to a certain degree. A partial collapse may occur in both lungs at the same time but if it is complete in both death results very soon.

Etiology.—Various writers list tuberculosis as the cause of spontaneous pneumothorax in 80 to 90 per cent of cases in adults and in 40 to 50 per cent in children. It occurs more often in the male between the ages of twenty and forty. Other causes are pneumonia, gangrene, empyema, lung abscess, emphysema, hemorrhagic infarct, bronchiectasis, pertussis, diphtheria (tracheotomy), foreign body aspiration, influenzal bronchitis and unknown (idiopathic).

The idiopathic group is small. About seventy-five cases have been reported all told. Palmer and Taft reported five cases in 1930. The group includes those in which no known cause can be demonstrated. In a series of cases reported by Lemon and Barnes no known cause was found in six out of fifty cases. In this group there may be undiagnosed tuberculosis, there may have been a rupture of an emphysematous bleb, or a visceroparietal adhesion may have torn resulting in a tear into the air cells of the lung. These cases are rarely fatal and recovery occurs in a month or six weeks. Healing should be complete within eight weeks unless complications arise. If recovery is prolonged beyond this period, the case in question should not be classed with the idiopathic group. Two of Palmer and Taft's patients had massive intrapleural hemorrhage but recovered.

Zahn is quoted as listing the etiology of the idiopathic group as follows: (1) rupture of a vesicular bleb; (2) rupture of an interstitial emphysema bleb, the air finally reaching the pleura; (3) the direct tear of the pleura by the tug of an adhesion; and (4) senile atrophy of the pleura.

Frequently pneumothorax will occur on one side fol-

lowing recovery on the opposite side. Hamman has noted sixteen such instances in the literature.

Pneumothorax may be simple or complicated with exudate which may be transient or prolonged. It may be of the check valve type. When the opening closes early the air is quickly absorbed.

The actual incident in producing the tear which allows air to reach the pleural cavity may be sneezing, coughing, hiccup or any sudden strain. As in the case which I am about to report there may be no definite evidence of an exciting event. It has occurred during rest or sleep.

In tuberculous cases the onset may be gradual on account of many pleural adhesions. In the absence of adhesions the onset is sudden and associated with sharp chest pains radiating to the neck or shoulder.

Diagnosis.—As a rule there is little or nothing in the history which will aid in diagnosis. Even after physical examination the exact condition will often be missed. The roentgenogram, however, is characteristic and definitely diagnostic. The type—unilateral or bilateral, partial or total, unilocular or multilocular, simple or complicated—is at once recognized. Marked depression of the diaphragm on the affected side and a displacement of the mediastinum toward the unaffected side suggests the check-valve type.

Signs and Symptoms.—Symptoms vary with the type of onset. If the onset is sudden there is pain, usually sharp and severe. It may be most marked substernally and radiate to the shoulder. Air hunger and cyanosis may be pronounced. The patient has an anxious expression and his heart is rapid. Cough may become very annoying. If the onset has been gradual the symptoms will be less marked or entirely absent. Later as the chest becomes more filled with air the patient complains of fullness and heaviness. He prefers to lie on the affected side. In a few days there may be no symptoms unless fluid accumulates.

The side involved is more prominent and the intercostal spaces are well filled out. The presence of maximum inspiratory resonance during both phases of respiration is the best physical sign. The percussion note is tympanic. Breath sounds are distant or absent. If fluid is present there is a succussion splash and a shifting of dullness.

The right side is involved more often than the left.

Prognosis.—As a rule the prognosis in the idiopathic variety is excellent provided the storm of the sudden onset is survived and provided it is unilateral. In bilateral cases death occurs within a few hours unless one lung is only partially collapsed.

In 1902 Fussel and Reisman collected fifty-six cases from the literature. Only one of these had died. In Staloff's list of eighty-four cases of all varieties of pneumothorax the mortality was 57%. Recurrences either on the same or opposite sides are common.

*Presented before the Lymanhurst Medical Staff December 22, 1931.

CASE REPORT

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Treatment.—Rest in bed is important. Strapping the affected side may give some relief.

Cough and pain should be controlled by sedatives. If fluid accumulates to any marked extent thorocentesis should be performed at intervals, a part only of the fluid being withdrawn so as not to reopen the fistula.

If the fluid becomes purulent, as is likely following pneumonia or lung abscess, free drainage should be instituted.

In the valve type of pneumothorax or if dyspnea becomes severe it may be necessary to aspirate enough air so that the lung can expand. This should be done under manometric control. Most patients adjust themselves very quickly to the new respiratory conditions and do very well under expectant treatment.

CASE REPORT

E. S., a university student, aged 26, came to my office on January 8, 1931 complaining of pain in his right chest and substernally. The pain radiated to the right scapular region and was most marked on deep breathing or on walking. There had been no weight loss, no night sweats and no hemoptysis. He tired easily and was dyspneic on exertion.

The present trouble began about December 1, 1930, with a persistent and productive cough, evidently an acute bronchitis. On December 14, 1930, he had pain in his right chest probably due to pleurisy. The sputum was examined and found negative. He continued his studies until Christmas vacation. He was apparently well at that time.

On January 1, 1931 while at home during the holidays and while resting on a couch before the noonday meal he noticed a peculiar sensation in his chest coming on after clearing his throat. The distress increased and he began to cough so persistently that he was able to finish his meal only with difficulty. He then began to notice dyspnea and palpitation. His heart rate was greatly increased. In the afternoon he walked to a physician's office and was given a sedative and digitalis. He kept quiet for a few days and returned to the University on January 6th.

Because of the persistence of his cough and substernal soreness and pain he was urged to have further studies made.

On physical examination the patient appeared somewhat undernourished. He weighed 175 pounds and

measured seventy-six inches. His color was good and he appeared free from pain.

The right chest seemed more prominent than the left and was hyperresonant. There was no evidence of excursion of the right diaphragm. Breath sounds were distant or entirely absent. The heart action was normal and the rate was 80. The blood pressure was 126 systolic and 80 diastolic. Temperature was normal.

The nature of the disorder was not recognized until the patient was placed behind the fluoroscope when it became evident that he had a complete right-sided pneumothorax. A plate was made for record. There was only a very small amount of fluid in the right costophrenic angle.

Because there was a question as to when this man could return to school, Dr. Jay A. Meyers was asked to see him as consultant. The patient was advised to stay in bed and he returned to his home in another city.

On February 24th he returned to Dr. Meyers' office with a roentgenogram, taken a week earlier, which showed the lung completely expanded. There was no evidence of pulmonary infiltration or other abnormality. The tuberculin test was negative.

On March 5th, he was feeling very well except for an occasional sharp pain in his right chest. His weight was 176 pounds. On physical and fluoroscopic examinations the chest appeared normal.

On November 19th, he reported that he never felt better and had had no pain for two months or more. He had no cough. Pulse, temperature and blood pressure were normal. His weight was 176 pounds. The chest presented normal findings. On fluoroscopic examination the lung areas were clear, there was no evidence of adhesions and the diaphragm was free.

Dr. H. D. Lees of the Students Health Service examined this man on February 24, 1930. Physical and roentgen findings of the chest were normal at that time.

CONCLUSIONS

This patient should be classified in the idiopathic group because no evidence of tuberculosis was found, because his acute bronchitis of December 1, 1930, had subsided and because he made a rapid and complete recovery and has remained well to this day.

It is probable that idiopathic pneumothorax occurs more frequently than is generally supposed because it is so easily overlooked unless a roentgenologic examination is made.

PRESIDENT'S LETTER

AN essay entitled, "The Next Twenty Years," written by Hans Zinsser of Harvard University, delivered at the opening of the new Lakeside Hospital in Cleveland and published in *Science*, October 23, 1931, is of unusual interest. Zinsser pointed out that in the last twenty years the medical profession has cleaned house, as it were. Whereas in 1910 we had 166 medical schools, we now have only sixty-six, but these are turning out a vastly better quality of physician than did their predecessors. Any one who has been in contact with this stream of recent graduates can vouch for this assertion. That these young men can have attained so much knowledge and understanding of the fundamentals of medical science and at the same time so much intelligent and definite information of the new things in medicine, is a credit to their respective universities. Zinsser expects that the rapidity of growth and expansion of hospitals, laboratories, and so forth, will now be slowed down and that we must learn to take advantage of all the wonderful equipment and tools we now possess.

Nothing is so constant as change and those in authority at large institutions having to do with the affairs of medical education and research, and consequently medical service to the public, are aware of this. Economic factors, often little understood, create demands that make for changes. Our own university has taken an important step in the last year, giving evidence that our Board of Regents realizes that it is impossible for one man in the position of dean to be efficient in the purely administrative side and to carry alone also the various responsibilities that go with educational, curricular and university affairs. The creation of the office of Dean of Medical Sciences is a distinct step forward.

Dr. W. J. Mayo has advised providing shorter elective courses in the various business, academic, and scientific fields, not necessarily leading to degrees, to suit the wants and the ability of the individual. In this manner would sources of information and leadership be afforded to the public to offset the misleading teaching of demagogues.

There are many questions that puzzle the thinking man in medicine. Are there too many graduates? Is too much emphasis placed on research and investigation? Are we trying to put men through a common mould, when better study of them as material, and selection of the proper mould to suit would be wiser? The old question of full-time teaching in clinical branches no doubt will gradually be solved, but it must be solved by the medical profession in an unselfish spirit. Are the American educational foundations forcing this system on the schools?

Professor Zinsser's article is written in an interesting and philosophical strain and is well worth reading. My reason for bringing it to your attention at this time is because in such periods as these we are more likely to pay attention to affairs that affect us from without our ranks and neglect that which might be termed our internal affairs. Medicine need not fear for it is a necessary and a most valuable part of the life of our nation. Zinsser says: "The fields of our endeavor have been fertilized with a beneficence and a public confidence unheard of in the history of education." We must keep our eyes on the future, safeguard what has already been attained, steer our course straight, and remain worthy of the generous support we have had from a kindly public.



President,
Minnesota State Medical Association.

EDITORIAL

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MANTOUX REACTIONS AND TUBERCULOSIS IMMUNITY

Science looks yearningly to the possibilities of direct immunological methods directed toward tuberculosis, such as have accomplished so much with diseases like typhoid and diphtheria. In the meantime, not a little difference of opinion appears in the theoretical attitudes of men closely applying themselves to the laboratory and clinical problems of tuberculosis. Disregarding the general immunity bestowed upon individuals by nature, resisting all inimical agents detrimental to health or inviting disease, it is worth while to bestow particular attention upon such evidence

of specific immunity as is now available. We may start, therefore, with the most approved skin reaction to tuberculin—the present Mantoux test. This is probably the most efficient agent yet devised with which epidemiologists, finding reacting youngsters, are in a position to investigate their elders for open contacts (often labeled chronic cough but really benign tuberculosis).

Minnesota and the adjoining neighbor states are essentially rural. Present day skin tuberculin tests among school children, candidates for college or nursing training schools, are showing a much lower level of positives than were shown some twenty years ago, when the late Dr. Lampson made a study of a sufficient number to give his statistics widespread quotation. Those who have strongly supported the sanatorium segregation program, as well as improved general hygienic living, hope that history will ultimately connect up this lessening of childhood or early adolescent primary (Ghon) inoculations, and later bodily (allergic) response, with this effort. Theobald Smith early enunciated the idea that the bodily defense reaction in the biological sense not only defended the host but the organism as well, thus establishing a friendly alliance "for better or for worse"—at least with no desire on the part of the tubercle bacillus to immediately perish with its host, as do the rapid and fatal epidemic disorders, such as bubonic plague. In other words, this neutrality paves the way for a trench warfare in which "cavitation and cough" (consumption) provide the stage for "droplet" transmission.

At this point opinions begin basically to differ. Minnesota continues to proffer important clinical and epidemiological evidence. Geer† shows that of nurses entering a large general hospital in St. Paul only 30 per cent showed reactions to the intradermal tuberculin on entrance, but practically all are positive before completing training. Over a two-year period six nurses have developed clinical tuberculosis and only one of these showed a positive tuberculin Mantoux on entrance. This is rather striking confirmation in

†Geer, Everett K.: Tuberculosis among nurses, Arch. Int. Med., 49:17 (Jan.), 1932.

America on the report of Johannes Heimbeck^f from Oslo in 1928. Somewhat alarming reports come from certain of our large eastern medical centers in terms of interns and their college and hospital residence and training. David I. Stewart of Ninette Sanatorium, Manitoba, recently writes that he considers a positive Mantoux in the adult the best specific safeguard against any fresh pickup of tuberculosis, except possible "massive infection," which, of course, every sane individual, of whatever age, would seek to avoid.

In rather direct contrast to this attitude is that of the Lymanhurst School of Minneapolis (Dr. J. E. Myers and his associate), who hold that this early Ghon regional tuberculosis response can in no way be held to be fortuitous, but that it rather prepares the stage or paves the way for a later adult response, which takes on the attitude of chronicity, dissemination, and prospect for fatality. They agree that the first contact (Ghon) need not always be mild, and admit that some constitutional dissemination with meningeal involvement can result. To those familiar with consistent autopsy revelations this cannot be denied. However, they proceed to emphasize the need of considering any and all Mantoux-positive school children, college folks, and presumably all adults, as dangerous fodder for tuberculosis, and, indeed, like gold "earmarked for export." They are, indeed, the immediate concern of zealous hygienists, if not therapeutic opportunists. It should be emphasized that this point of view is more encouraged by those whose interests are more and more epidemiological and less concerned with the aftermath of anxiety and perturbation incidental to any type of "earmarking."

Geer's statistics seem to indicate that, in contrast to the smaller private hospitals, large general hospitals pick up more concealed cases of tuberculosis, masquerading under other entrance diagnoses, from which careless spitters give not only the avenue for inoculation of previously non-reacting personnel, but also in furnishing "massive infection" to all; furthermore, that whatever relationship positive Mantoux may have to the question of constitutional immunity, those recently made positive by contact either develop a first inoculation which is not mild and self limiting, or a persistent one that induces consumption. The evidence given, however,

would indicate that Geer's clinical cases were not essentially different from those accepted as the usual adult response. Pathologists are not ready to abandon the attitude of Theobald Smith, and it is difficult to convince them that viable tuberculosis germs do not abide about the original tubercles and the regional hilus caseating glands. The clinician studying children most closely is likely to attribute too much significance to the entire group on account of the relatively limited number in which he may demonstrate roentgen shadows indicative of hilus or parenchymal invasion. Reasoning from these, he would appear to be too critical of the much larger group, in which his admittedly inefficient stethoscope is little less accurate than the most definitive roentgen films. Furthermore, American clinicians up to date have given far too little consideration to Assman's epoch-making observations upon the adult exudative subclavicular extensive shadowing, beginning as dramatically as does the allergic response of the skin to urticaria or angioneuritic edema. These points have not been sufficiently considered, and we are still in the dark as to the relative proportion of these that arise from fresh external reinfection or from Herxheimer-like reactions about old childhood foci. The difficulty persists to determine the status of the individual's immunity in terms of such factors as pregnancy, intercurrent infections or biochemical disturbance. Nevertheless, the present evidence would appear to make it totally unfair to invidiously "earmark" so many young Mantoux reactors.

E. L. T.

THE ANNUAL CONGRESS ON MEDICAL EDUCATION, MEDICAL LICENSURE AND HOSPITALS

The Annual Congress on Medical Education, Medical Licensure and Hospitals, held under the auspices of the American Medical Association in Chicago on February 15 and 16, was very well attended and seemed a more interesting meeting this year than usual.

The high light of the meeting seemed to be the discussion of the hospital situation. Dr. Ray Lyman Wilbur came out very strongly opposed to any marked extension of the federal hospital program for veterans of the World War. In fact, a great deal of the meeting seemed to center

^fHeimbeck, Johannes: Immunity to tuberculosis, Arch. Int. Med., 41:336 (March), 1928.

around hospitals and hospital service, and the economics of the medical profession came in for an unusual amount of discussion.

In the section of Medical Education various remedies were suggested for the cost of medical care and Dr. Hugh Cabot seemed to take the center of the stage with his idea of big business in medicine. The papers quoted him liberally and his theory that corporations should deliver medical service to their employes on a large scale and for minimum cost. Dr. S. Marx White was given credit for the idea that more group practice might help the situation. Dr. Steven Rushmore, of Boston, seemed to feel that neither of these remedies would have any effect on the situation.

The topic which seemed to attract most attention, according to the attendance reported, was the care of veterans, in the Annual Conference on Hospital Service. The Chairman, Dr. Mock, opened the subject with a very illuminating discussion, asking for sincere study of the situation, taking the stand that for the veterans themselves the increased use of federal hospitals for non-service-connected disabilities would result in poor medical treatment for the veteran. Mr. Ed Hayes, member of the National Rehabilitation Committee of the American Legion, gave a very eloquent discussion of the situation, asking for the earnest coöperation of the American Medical Association in working out the best possible plan for the care of disabled veterans. Mr. Paul Fesler, President of the American Hospital Association, discussed the various conferences which have been held with the American Legion and the American Medical Association. He urged that the community hospital should be used for veterans who are now waiting for treatment because of lack of facilities of the federal hospital. He also spoke of the McClintic Bill, asking for a change in the law so that veterans might be taken care of in community hospitals by the local physicians. Dr. Elliott, of Chicago, urged greater interest in the care of cancer cases. There was considerable general discussion and the consensus of opinion seemed to be that the use of the community hospital and its development is the most important factor in the proper care of the general acute medical and surgical conditions among the veterans and that the early treatment of acute medical and surgical conditions was the greatest factor in preventing chronic disabling conditions leading to permanent hospitalization.

At the luncheon of the American Hospital Association on Tuesday plans were made for careful study of costs of the care of veterans in federal hospitals and the civilian hospitals, particularly as applied to similar groups of cases. It was expressed there by Mr. Hayes and a number of others that a good slogan next year for the American Legion and the American Hospital Association would be the standardization of the community hospitals throughout the country, looking forward to their increased use for disabled veterans at government expense. There was a general expression of opinion for continued coöperation not only nationally but in every state, looking forward to the better solution of the care for disabled veterans. It was generally agreed that the government should continue to provide facilities for the care of nervous and mental conditions, tuberculosis, and other chronic disabling conditions in veterans, but that the policy of the future should look toward the care of all medical and surgical conditions, and especially the acute medical and surgical conditions, in the local community.

C. B. WRIGHT.

HEALTH INSURANCE

According to some recent newspaper reports there seems to be some indication that one of the recommendations of the Committee on the Cost of Medical Care of which the Secretary of the Interior, Dr. Ray Lyman Wilbur, is the chairman, will be the adoption of some form of insurance as the solution of the unequal distribution of the high cost of sickness.

Editorial advocacy of this solution to the difficulty has appeared in our columns from time to time. Health insurance is not new even in our own country. Unfortunately some insurance companies have had adverse experience in this type of insurance. The solution advocated therefore is not likely to be simple in execution.

It is perhaps not surprising that most individuals are anxious to collect from insurance policies of every kind. It is a sad commentary on the innate honesty of human nature that a large percentage of individuals are prone to exaggerate illnesses in order to collect on their insurance. Such an attitude places the certifying physician in an awkward position and too often he yields to pressure and stretches the truth as to the real disablement.

All types of insurance are abused at times by

the unscrupulous. This does not seem sufficient reason for condemning health insurance as a whole. The mutual character of certain group insurance seems to exert a restraining influence on the unscrupulous which is lacking in other quarters.

Other factors will militate against the successful adoption of a general insurance program. One is the variation in the cost of medical care in various localities.

While the total cost of sickness in the country at large is not much more than it should be for value received, the indications are that the rates necessary will be more than the man with the average income is likely to want pay voluntarily. He will be inclined to take the chance that he and his family will escape serious illness. The question will then arise as to the advisability of compulsory insurance.

Ideally, health insurance should be universal. The fact remains that someone pays the cost of sickness as conditions exist at present. The cost of the care of the indigent can be found in taxes, community chests, and other forms of charity, not the smallest item being the free services rendered by the medical profession. The well-to-do, although occasionally inconvenienced by the cost of sickness, can usually take care of such emergencies. The remainder of the population, which constitutes the large majority of individuals, are the ones who require some form of insurance.

The question is sure to arise as to the advisability of the government going into the business of health insurance. Many nations have adopted some form of government insurance. Where the patient retains the right to choose his own physician seems the least objectionable form of government insurance.

The medical profession in this country is opposed to the government's providing health insurance or entering any business that can be handled by private enterprise. One has but to reflect on past experience to be convinced that governmental management is extravagant and sure to become involved in politics.

It is to be hoped that an insurance genius will bring forth some solution to the problem of furnishing health insurance to the public at large. The extensive study of the subject being completed by the Committee on the Cost of Medical Care should furnish the necessary data for this solution.

OF GENERAL INTEREST

Dr. and Mrs. Roger G. Hassett, Mankato, Minnesota, are the parents of a baby son, Roger, Jr., born January 24, 1932.

Dr. Silas Anderson has been elected new chief of staff at St. Andrew's hospital, Minneapolis. Dr. W. H. Ude was named vice chief and Dr. F. R. Gratzek secretary-treasurer.

Dr. Arthur Edward Smith, Minneapolis, has been appointed Chief Oculist for the Minneapolis, St. Paul and Sault Ste. Marie Railway, effective January 1, 1932.

Dr. Hilding Berglund has resigned as chief of the medical department at the University Medical School, effective June 30, 1933, and will spend the year beginning July 1, 1932, in absentia.

Dr. C. J. Litzenberg of Minneapolis appeared as one of twenty-four lecturers chosen from throughout the United States at the forty-eighth annual convention in Memphis, Tenn., of the Mid-south Post Graduate Medical Assembly held February 9 to 13.

Dr. E. W. F. Exley, recently associated with the Goslin Clinic, Green Bay, Wisconsin, has returned to Minneapolis, where he has opened an office at 1649 Medical Arts Building for the diagnosis and treatment of genito-urinary diseases.

Dr. J. F. McClendon, Professor of Physiological Chemistry at the University, will leave about the middle of March with his family to accept an invitation to spend a year as Visiting Professor under the Rockefeller Foundation at the Tohoku Imperial University at Sendai, Japan.

Dr. Murl J. Robertson, graduate of the University of Minnesota Medical School, 1930, who spent the past year as Interne in the Detroit Receiving Hospital, Detroit, Michigan, has purchased the practice of the late Dr. Mertens of Bayfield, Wisconsin.

Dr. Robertson is the son of Dr. J. B. Robertson of Cottonwood, Minnesota.

The University of Minnesota Medical School had as a visitor last month Dr. Ebaugh, Director of the Colorado Psychopathic Hospital, who is making a survey of all the medical schools of the country for the Mental Hygiene Board. Dr. Ebaugh is reported to have been impressed with the need for development of the work in psychiatry at the University and that a psychopathic unit is one of the great needs of the University at the present time.

The next written examination of the American Board of Obstetrics and Gynecology will be held in nineteen different cities of the United States and Canada at 2

p. m., on Saturday, March 26, 1932. The general, oral and clinical, examination will be held in New Orleans on Tuesday, May 10, 1932, immediately preceding the meeting of the American Medical Association. Reduced railroad fares will be available. For detailed information and application blanks, apply to the Secretary, Dr. Paul Titus, 1015 Highland Building, Pittsburgh, Pennsylvania.

Dr. W. I. Lillie of the Section of Ophthalmology of The Mayo Clinic is spending six weeks in Shikarpur, India, at the Seth Heranand Charitable Eye Hospital where Mr. H. T. Holland, F.R.C.S., of the Church Missionary Society Hospital, Quetta, Baluchistan, India, is holding his annual eye clinic. Large numbers of ophthalmologic operations are being performed, and Dr. Lillie, and Dr. O. B. Nugent and Dr. A. B. Cushman of Chicago, are sharing in the work. Dr. Lillie will leave Shikarpur, February 16, for Bombay. From there he will travel to Tokyo, and then across the Pacific to Vancouver. He will arrive in Rochester April 1.

Dr. Leonard G. Rountree, Professor of Medicine, University of Minnesota, and senior consultant in medicine and director of clinical investigation of The Mayo Clinic for twelve years, has been chosen medical director of the Philadelphia Institute for Medical Research.

Dr. Rountree will leave the Clinic in mid-summer to take up his work as director in the newly developed institute in the autumn on completion of the building in Philadelphia.

Dr. Rountree came to Rochester in April, 1920. Previously for four years, he was director of the department of internal medicine at the University of Minnesota.

MINNESOTA STATE BOARD OF MEDICAL EXAMINERS

OPERATOR OF BEYER SYSTEM CLINIC PLEADS GUILTY

State of Minnesota *vs.* Cary Beyer

On January 18, Carl Beyer, operator of the Beyer System Clinic, located in the Loeb Arcade, Minneapolis, Minnesota, entered a plea of guilty to practicing healing without a Basic Science Certificate and was sentenced by the Honorable Frank E. Reed, Judge of the District Court, to pay a fine of \$200.00 or serve sixty days in the Minneapolis Workhouse. The defendant paid the fine. In imposing sentence, Judge Reed informed the defendant, in no uncertain terms, that if he were brought back before the court for a second violation of practicing healing without the proper license, he would be given the maximum penalty of one year in the workhouse with no chance to pay a fine.

For several years Beyer has been operating the Beyer System Clinic and advertising the successful treatment for diabetes, gall stones and other serious ailments, over the radio and in the Twin Cities daily newspapers.

As a result of this advertising, Swen Bonderson, a farmer living near Shafer, in Chisago County, Minnesota, took his sixteen-year-old boy to the Beyer Clinic for treatment of diabetes. Bonderson paid Beyer \$325.00 cash in advance, for a successful treatment for his boy. The condition of the boy did not improve and Mr. Bonderson, upon discovery of the fact that the defendant was not licensed, made a complaint to the Medical Board. Beyer was arrested on January 8, and released on \$1,000.00 cash bail.

Beyer was formerly connected with the Loring Park Clinic of Minneapolis and for some time prior to 1914, he was in the patent medicine business in Winnipeg, Manitoba. He claims to be from Austria and to be a dietitian.

The conviction of Beyer marks the end of one of the most open violations of the medical laws of this state. Beyer was listed in the building directory as a doctor. The only proof discovered by the Medical Board that the defendant was a doctor, is a diploma hanging in his office indicating that Carl Beyer had received the degree of Doctor of Herbology in 1909, which diploma is absolutely worthless in this state in so far as any right of the defendant to practice healing is concerned.

Judge Reed is to be highly commended for the vigorous and emphatic manner in which sentence was imposed upon the defendant. Such a frank expression by the court as to what lies ahead of the defendant for a second violation of the medical laws of this state does a great deal more to eliminate quackery than the imposition of the sentence itself.

CHIROPRACTOR PLEADS GUILTY TO PRACTICING MEDICINE

State of Minnesota *vs.* Frederick I. Sheldon

On February 2, 1932, Frederick I. Sheldon, licensed chiropractor with offices at 800 Nicollet Avenue, Minneapolis, Minnesota, entered a plea of guilty to a charge of practicing medicine without a license, filed against him following an investigation of his activities by the State Board of Medical Examiners.

Sheldon was sentenced by the Honorable Frank E. Reed, Judge of the District Court, to a term of three months in the Minneapolis Work House. After admonishing the defendant to confine his practice to that of chiropractic and warning him that in the event of another prosecution he would be compelled to serve the three months Work House sentence, Judge Reed stayed the sentence for one year.

Complaint had been made to the Medical Board by Mr. Henry Berg, 2941 Pleasant Avenue, Minneapolis, that Mrs. Berg had been under Sheldon's care for several years and was being treated with so-called Lowenthal capsules furnished to Mrs. Berg by Sheldon. Mr. Berg claims that he was being charged \$8.00 per box of 100 capsules. The prescribing or use of any such treatment by a chiropractor is a positive violation of the Medical Practice Act and resulted in the filing of a complaint against Sheldon. Mrs. Berg's ailment has been diagnosed as paralysis agitans.

**A FORUM OF THE
COMMITTEE ON PUBLIC HEALTH EDUCATION**

Let the Doctor Decide

This is the year set for that imposing and expensive body, the Committee on the Cost of Medical Care, to write its prescriptions for the cure of medico-economic ills.

If certain recent publicity issued by Chairman Secretary of the Interior Ray Lyman Wilbur, Chairman of the Committee, may be taken as a sign, the prescription will be for a system of civilian health insurance with the government, possibly, writing the policies.

At any rate, a significant front page story appeared in February in the United States Daily, that unique publication under the management of the newspaper correspondent, David Lawrence, devoted wholly to government news, and it came direct from Secretary Wilbur's office with his official approval.

"To relieve patients of the heavy costs of medical care in the United States," says the story, "it has been suggested that a system be worked out for the regular and orderly payments like life insurance payments, the Committee on the Costs of Medical Care announced in a statement received today from the Department of the Interior. The statement of the committee, of which Ray Lyman Wilbur is Chairman, follows:

"The costs of medical care might be modeled on a system of regular and orderly payments like life insurance in order to remove some of the difficulties attendant upon the present system of medical care and costs, it was suggested by Miss Mary Dublin in a paper just submitted to the Committee on the Cost of Medical Care.

"This important suggestion *may be of epochal significance to the health of the entire nation* (the italics are ours) was made as a result of a study of the comparative expenditures for insurance and the expenditures for medical care.

"Miss Dublin's survey is being published, the Committee points out, as one of its miscellaneous contributions and a possible help in answering the question: How may the ordinary family provide against an uncertain financial burden which may be very large in proportion to the family budget and which is likely to be uneven month by month and year by year?"

There is more in the statement to the same general effect.

Is organized medicine ready to take a stand for or against such a proposition if it is, indeed, incorporated in the final recommendations of the Committee? Ready, that is, with figures and facts to match the glittering array that will be cited by Committee protagonists of health insurance?

Will organized medicine be ready to show by an equally exhaustive and complete study of results of national health insurance in France and Germany and England, for example, that its position on the question is founded upon equally sound and disinterested observation? The report of the Committee on the Cost of Medical Care will be a challenge to the statesmanship and stability and alertness of the medical profession. A recommendation on the part of the Committee for general health insurance will automatically create a serious problem which cannot be met by a scowling resistance on the part of the profession. If it is possible for one people to learn from the mistakes of another, then America will not fall into the error that is reducing medical practise to the football of depleted budgets, or government rules and regulations in other nations.

Health Benefits Increase Among Employees

Three hundred and fifteen commercial and industrial institutions out of a total of 602 who replied to a questionnaire sent out by the United States Public Health Service now have some form of insurance and health benefit service for their employees.

As a general conclusion of the reports of the 315, the Public Health Service cites the following paragraph:

"As a time-tested organization attempting to meet the needs arising from certain contingencies in the life of the wage earner, the employees' sick benefit association appears to have found a place for itself in many industrial and mercantile firms. In recent years a number of them have gone beyond the original plan in an attempt to explore and develop new fields of service and usefulness to their members. One of these relatively untilled fields consists of organized effort to obtain accurate diagnosis followed by appropriate medical attention and nursing care including hospitalization if needed and to secure such in the early stages of disease so that the duration of disability may be shortened as much as possible. Another important field which the more audacious organizations are beginning to till is that of disease prevention including (a) the discovery and correction of physical impairments which if neglected may cause disability and (b) health educational activity, especially in the hygiene of living."

OBITUARY

Dr. Albert E. Flagstad

1891-1932

Dr. Albert E. Flagstad was born in Minneapolis and died at the age of forty on January 26, 1932.

A graduate of the University of Minnesota Medical School, he became associated with the late Dr. Arthur Gillette and later with Dr. C. C. Chatterton and William H. von der Weyer with offices at the Moore Building, Seven Corners, St. Paul, and contributed his services to the Gillette Hospital for Crippled Children, St. Paul, until his death. His last operation, in fact, was performed at this hospital, when already ill, less than a week before his death.

Dr. Flagstad was appointed deputy coroner in Hennepin County and opened an office in Minneapolis for the practice of orthopedics two years ago, taking a suite with his brother, Dr. Carl Flagstad, dentist, at 1549 Medical Arts Building.

A member of the Hennepin County Medical Society and the Minnesota State Medical Association, Dr. Flagstad also had membership in the American College of Surgeons and the American Orthopedic Association. He was also a member of the Phi Rho Sigma medical fraternity. He is survived by his widow and daughter, and a brother, all of Minneapolis.

Dr. Flagstad was recognized for his ability in his chosen field of orthopedics, his limitless energy and his devotion to his patients.

Dr. J. A. Freeborn

1864-1932

Dr. J. A. Freeborn, prominent physician and surgeon of Fergus Falls, died at the Mayo hospital at Rochester Monday, January 25, 1932. The cause of death was cancer.

Dr. Freeborn was born in Waterloo county, Canada, in 1864, and died at the age of sixty-seven years. He was the fourth child of a large family and grew to manhood on his father's farm, attending the country school and graduating from the high school of a neighboring city in 1881. He entered a drug store at Stratford, Canada, as a clerk, and later accepted a similar position in London, Canada. In 1884, he located in Big Stone City, S. D., and opened a drug store, which he operated for two years.

He had become deeply interested in medicine and in the fall of 1886 he entered Rush Medical College in Chicago, from which he graduated in 1889. He then located at Ortonville, Minn., and practiced his chosen profession there until 1891. He then entered Bellevue Hospital and Medical College in New York City, receiving his degree from that institution a year later. He returned to Ortonville and practiced medicine there until 1896, when he came to Fergus Falls, where he had since been engaged in active practice. He was a student as well as a physician, and kept fully abreast

of all the latest developments in medicine. He specialized in eye, ear, nose and throat, taking special courses in Chicago and New York and also taking X-ray work there and in Europe.

In 1891, Dr. Freeborn married Lillian Anderson, whose home was in Rochester, Minn., but who had been teaching in Ortonville. Three children were born to them: Gertrude, now Mrs. Paul Francis, of Minneapolis; Frances, now Mrs. Howard Vandersluis, of Fortress Monroe, Virginia; and Constance, now Mrs. Elmer Haugen, of Pelican Rapids.

Mrs. Freeborn died in 1915. The doctor later married Miss Agnes C. Hanson, a nurse at the Wright Hospital, Fergus Falls. During the World War, Dr. Freeborn served in the Medical Reserve corps, with the rank of captain, at Camp Custer, and his wife served as a nurse at Camp Dodge. They have one adopted son, Jack Freeborn.

Dr. Freeborn was not only an able physician, but he was highly regarded as a citizen. While quiet and unassuming, he took an active interest in public affairs, and was a member of the Rotary Club and of the executive committee of the Red Cross, and of other organizations.

Dr. John Farquahar Fulton*

1856-1932

In the passing of John F. Fulton on January 31, 1932, one of the foremost figures is lost to ophthalmology and the medical profession of the Northwest. Descending from Scotch-Irish ancestors who settled in this country about 1730, Doctor Fulton was born in York County, Pennsylvania, about fifty miles south of Philadelphia, April 20, 1856. Educated at York Collegiate Institute, he at first had leanings toward the ministry. Because of astigmatic trouble with his own eyes and consequent contact with oculists, he became interested in medicine and matriculated at the University of Pennsylvania in September, 1877. His preceptor was Dr. D. Hayes Agnew, and among the faculty during his student days were Tyson, Pepper, Horatio B. Wood, Weir Mitchell, Gross, and many other men of that day. Already possessed of a fair classical academic education, he became an excellent student of medicine and was graduated in 1880. Later Dr. Fulton was awarded the degree of Ph.D.

After an internship at the Pennsylvania Hospital and the Wills Eye and Ear Infirmary, he began practice at Altoona, Pennsylvania, then a city of 25,000, and soon established himself in general practice. Coming west to attend the A. M. A. meeting in 1882, Doctor Fulton was attracted to St. Paul and succeeded to the practice of Dr. Atwood, who was practicing ophthalmology in St. Paul and who died shortly after Doctor Fulton's arrival. He restricted his practice to ophthalmology and otolaryngology at once.

Dr. Fulton brought with him not only an excellent academic, professional, and special training but the very best traditions of medicine, and a standard of ethics

*Committee report read before the Ramsey County Medical Society, Feb. 29, 1932.

toward confrères and patients which was ever a part of his naturally scrupulous and conscientious character. Thus, he soon became firmly established as the foremost ophthalmic surgeon in the Northwest during the period preceding aseptic surgery or the use of local anesthesia, and was privileged to witness the enormous evolution and development of medicine, surgical technic, and medical education during his half century of special practice. His prominence and reputation as an ophthalmologist were well deserved because of his natural aptitude, thorough medical training, outstanding personality, and conscientious devotion to his calling.

Very early in his career, Dr. Fulton became identified with medical organization and with teaching. He was associated with Drs. Perry H. Millard, C. A. Wheaton, C. Eugene Riggs, Albert E. Senkler, Parks Ritchie, Alexander Stone and Dr. LeGrande Denslow, in organizing the old St. Paul Medical College which later merged with the Minnesota Hospital College to become the Medical College of the University of Minnesota. He was its first professor of ophthalmology and otolaryngology and was emeritus professor of ophthalmology for many years preceding his death. It is reported that largely through Dr. Fulton's personal efforts, the legislature made its first large appropriation of \$100,000 in support of University medical education. When the Minnesota Academy of Medicine was organized, October 15, 1887, John Fulton became its first president. He was president of the Ramsey County Medical Society in 1893 and in 1897 was elected President of the State Society. Doctor Fulton was a member of the American Ophthalmological Society, the American Academy of Ophthalmology, and the Minnesota Academy of Ophthalmology, serving at one time as president of the latter. Also, he was a member of the Ophthalmological Society of the United Kingdom.

On April 11, 1888, Doctor Fulton was married to Edith Wheaton, a sister of Doctors Charles and Robert Wheaton, prominent surgeons of St. Paul, who, with four daughters and one son, survives him. The daughters are: Mrs. Paul Judson, Oakland, California; Mrs. Harold Booraem, of Minneapolis; Mrs. Leonard Berg and Mrs. Richard Relf, of St. Paul. Dr. John F. Fulton, Jr., is professor of physiology at Yale.

Dr. Fulton was naturally congenial and popular, ever ready to sacrifice personal interests for those of his friends, his patients or his profession. These very traits resulted in sacrifice of an enormous practice, perhaps at one time the largest personal following in Minnesota. His large practice was well deserved through his ability as a clinician, his manipulative dexterity and good judgment in ophthalmic surgery and as the result of a powerful but gracious personality. His wide range of reading in medicine and current events, combined with a remarkable memory, unfailing good humor, and a fund of anecdotes made him an interesting participant in any gathering, and a worthy companion. Even during later years, Dr. Fulton was always abreast of the times and conversant with recent medical literature, often surprising younger colleagues by his thorough knowledge of the latest contributions, not only to his

(Continued on page 215)

MISCELLANEOUS

THE UNIVERSITY HEALTH SERVICE

HAROLD S. DIEHL, M.D., Director
Minneapolis

The Students' Health Service of the University of Minnesota is an organization concerning which practically every physician in Minnesota has an opinion more or less favorable or unfavorable. Few physicians, however, know intimately or accurately of the work of this department; hence this brief report of its purposes, policies and activities.

Charles Lamb was once requested by a friend to come with him so that he might introduce him to a man standing across the room. "No, thank you," replied Lamb, "I hate that man." "But," said his friend, "you should meet him. He has many admirable qualities." "That is just why I don't want to meet him," said Lamb, "because if I should know him better I might not be able to hate him any more." This is illustrative of what happens to most physicians when they become acquainted with the work of the Health Service.

The Students' Health Service was established at the University of Minnesota twelve years ago because the administrative officers and the regents of the University felt that they had a responsibility to safeguard the health of the thousands of students who come together each year upon the campus. The service first provided was only medical attention and infirmary care. Such service to students always will remain of major importance, but in recent years more and more attention has been given to the health of students who are presumably well.

STAFF

In the past ten years, the professional staff of the Health Service has increased from one physician on full time and four on part time, to ten physicians on full time and thirty physicians and twelve dentists on part time, in addition to nurses, technicians, clerks, and stenographers. All full time physicians do some teaching in addition to their Health Service duties, while the physicians on a part time basis are engaged also in private practice. This staff is able to provide general or specialized medical service which students may need.

ACTIVITIES OF THE HEALTH SERVICE

The activities of the Health Service include the control of communicable diseases; complete physical examinations and health conferences for all students who enter the University; annual health examinations for those who desire them and as a requirement for students in the colleges of medicine, nursing, dentistry and education; clinic service for medical advice or care throughout the day and emergency service at any hour of the day or night; hospital care for students in need of hospitalization; dentistry, X-rays and laboratory service.

COMMUNICABLE DISEASE CONTROL

The control of communicable diseases in the student

group depends primarily upon the early diagnosis and isolation of students with communicable diseases, the supervision of contacts and suspects, and the administration of certain immunity tests and vaccines.

HEALTH EXAMINATIONS

The health examinations, both entrance and periodic, are thoroughly and carefully performed, the student spending almost an hour with the physician, in addition to the time required for filling out the history blank, performing vision and hearing tests, taking weights and measurements, and doing laboratory work. Upon the completion of the physical examination, the physician discusses with the student his health and habits of living, and gives such advice and counsel as seems indicated, a summary of which is given to the student in the form of a health prescription. Follow-up studies to determine the significance of findings noted during these examinations are made by the Health Service in case students do not follow the suggestion that they go to their private physicians for such service.

Each year these examinations lead to the discovery of a few serious diseases and many minor defects. In the group of students who entered the University during the present school year, routine X-ray plates of the chest were taken on all students who showed positive reactions to tuberculin. These led to the diagnosis of one case of far advanced, five of moderately advanced, and nine of incipient tuberculosis. In another group of five thousand students who received periodic examinations during the past two years, ten cases of syphilis were discovered as a result of routine Wassermann tests. Each year, certain students are found to have diabetes, nephritis, or heart disease, while others who thought that they had such diseases have been assured that the diseases do not exist. Minor defects such as malnutrition, dental caries, abscessed teeth, impairments of hearing, defective vision, hernias, etc., are found in a large percentage of the students examined. As a result of these examinations, students with major illnesses are placed under treatment, and many of the minor defects are corrected. In addition, the Health conferences between physicians and students are probably the most effective means of health instruction in the University.

OUT-PATIENT SERVICE

The out-patient dispensary or clinic of the Students' Health Service makes medical service easily available at any time. In this department, students may consult physicians either in general medicine or in the various specialties. An average of about two hundred and fifty calls per day are made voluntarily by students to this department. Most of these calls are for very minor illnesses, in fact, probably not ten per cent of these students would ever reach physicians if the Health Service did not exist. The other ninety per cent would receive their medical advice from friends, landladies, or the corner drug store. Yet, it is only by encouraging students to report with illnesses which they may consider minor, that it is possible to make early diagnoses of serious illnesses or contagious diseases.

HOSPITAL CARE

To the Health Service hospital, any University student may be admitted, but the policy is to advise students who have family physicians to go home and place themselves under their care. Students living in dormitories or rooming houses are usually admitted directly to the Health Service hospital, but if the illness seems serious or if an operation becomes necessary, the student is urged to get in communication with his family or family physician and find out whether they can arrange to have this specialized service provided in one of the private hospitals of the city. Since the University makes no distinctions between students on a financial basis, it has never seemed desirable to attempt to set up economic standards for the admission of students to the Health Service hospital. On the other hand, if it is consistent with their welfare, the Health Service always urges those students who can afford to do so to secure medical service from their private physicians.

This hospital service for students, or it might better be called infirmary service, because, under ordinary conditions, very few of these students would be sent to a hospital, is of the greatest importance to students who are sick away from home. The expressions of appreciation from parents, physicians, as well as others, leaves no doubt in regard to the feelings of relief and security which parents have because of the facilities which the Health Service makes available to their sons and daughters. As I am writing this paper, forty-five students are patients in our Students' Hospital. Most of these have respiratory infections; several have had injuries; two probably have pulmonary tuberculosis; one has scarlet fever; two, broncho-pneumonia; three, gastro-enteritis; three have had operations, etc. I wonder, as I look over the list, where these students would be and what sort of care they would be receiving, if the University had not provided a Health Service to care for them. A few probably would be in hospitals; the boy with the scarlet fever, who lived in a dormitory but was isolated with a sore throat three days before the rash appeared, doubtless would be in the contagious section of the Minneapolis General Hospital, but until the rash appeared he certainly would have remained in his dormitory, exposing many other students; most of the others probably would be in bed in dormitories or in fraternity or rooming houses. What an undesirable situation that would be and how our University tolerated it as long as it did is difficult to understand. The character of the professional service and hospital care which the Health Service provides for students is such as we would wish for our own sons and daughters attending college away from home.

SPECIAL DEPARTMENTS

The pharmacy, X-ray and dental departments of the Health Service are operated on a self-supporting basis, fees being charged for the services rendered. The purpose of these departments is to provide such diagnostic, corrective and therapeutic services as are necessary to safeguard or improve the health of students.

SOURCES OF REVENUE

The entire operating budget of the Health Service comes from the students. Approximately two-thirds of the total budget is allocated to the Health Service from the incidental fees which students pay, there being no special health fee; the remainder accrues from certain fees which are collected for individual services such as X-ray, dentistry, drugs, glasses, use of the operating room, board and laundry in the hospital after two days, etc. No charges are made for professional services rendered by members of the staff.

RELATION OF HEALTH SERVICE TO PRACTICING PHYSICIANS

The Health Service desires to coöperate in every way possible with physicians engaged in the private practice of medicine. Any information which we have about the health of students, we are glad to make available to the private physicians of these students and we welcome information from physicians about students who have been under their care. Certain procedures, such as certification for athletics, military drill, physical education, teachers' certificates, etc., are responsibilities which this department must assume, but in certain cases the family physicians must have information which would be distinctly helpful in passing upon these cases. Occasionally students come to us who are under the care of private physicians. In such situations, we always desire to coöperate with the student's physician if we learn of his interest in the case.

Some physicians seem to think that the activities of the Health Service detract materially from the income of physicians in this community. Actually, however, I firmly believe that the balance is on the other side. True enough, a few physicians would receive fees from students for medical services which are now rendered by the Health Service, but the total of this amount probably would be but a small fraction of the \$62,000 which the Health Service is paying this year to physicians of Minneapolis and St. Paul for service to students.

Another report occasionally heard by physicians is that the Health Service frequently operates upon students who can well afford to pay the fees of private surgeons. The facts are that, although practically all of the students who are operated upon at the Health Service are self-supporting, an occasional student who might be able to pay probably does receive a major operation here without charge. The welfare of the student, of course, must be the first responsibility of the department. On the other hand, since no fees are charged, the Health Service has nothing to gain by the performance of operations and no member of the staff wishes to assume responsibility which he can properly pass on to someone else; furthermore, it is our desire to coöperate and not compete with physicians and surgeons in practice. These are the reasons for our policy of referring students with major illnesses to private physicians whenever possible.

Important as such immediate relationships of this service seem to be to the practice of medicine, the remote results of this work, we believe, contain infinitely greater possibilities, and all of these tend as the of benefit to the medical profession as well as the

public. The medical experience and health education which some six thousand students are unconsciously receiving each year from thorough physical examinations and health conferences, the custom of an annual physical examination which hundreds of students practice and the habit of seeking medical service promptly when ill, which most of the twelve thousand students learn while here, cannot fail to exert a very real and favorable influence upon the subsequent health and medical practices of these young men and women. Certainly most of these students leave the University with a better understanding of modern medicine than they ever had before and they no longer will be satisfied with slipshod medical practice or superficial physical examinations. Charlatans and quacks will have but little chance of ever selling their particular brand of therapeutics to these students.

In conclusion, I should like to state that I believe that every activity of the Health Service is fully justified, that physicians of this community receive more income through the Health Service than they would from the student body if the Health Service did not exist, that the end-results of this work will react greatly to the advantage of both the public and the medical profession; and finally, that the Health Service always considers it a privilege to hear from and coöperate with family or private physicians in the proper care of students attending the University.

MOST GOVERNMENTS ARE INEFFICIENT OR CORRUPT—SOME ARE BOTH*

EDWARD H. OCHSNER, M.D.

Chicago, Illinois

One of the very first questions that naturally arises is: Have any of our governmental agencies so conducted themselves in the past as to make it reasonably safe for us to entrust so stupendous a function as universal social insurance to any branch or department? I maintain that most of our local as well as state governments are inefficient or corrupt, and some are both.

Let any one who doubts the correctness of this statement spend a little time to look around with a critical eye and observe how most local governments, the various departments of the state in which he lives, and the departments of the federal government are conducted, and I am convinced that he will find more inefficiency than he has ever dreamed could exist. If he does not personally know of corruption and inefficiency in government, let him but scan one single daily newspaper regularly for a month in order to be convinced. And what else can one expect who is at all familiar with politics as it has been played and managed in these United States in the year 1931—the manner in which most men secure their nominations and later their elections, and to whom they are beholden when they take office?

We have all seen the statement repeatedly in the

*One of a series of articles appearing in state medical journals on various phases of socialized medicine.

public press, but have never seen it successfully refuted, that in many of the political subdivisions of our country only sixty per cent of the taxes collected are effectively spent, the remainder being frittered away, wasted or stolen. This inefficiency and corruption is due to many causes, of which some of the more important are:

The fact that so far no formula has been discovered according to which the most efficient, honest, industrious and worthy members of the community can be secured for public office. Nor has there been any method devised whereby spoils, politics, favoritism, pull, nepotism, waste and graft can be eliminated with even a reasonable degree of certainty. The individual who could solve these two problems would not only be the greatest benefactor of the human race but the wisest man the world has so far produced. Plato tried to solve this problem twenty-three centuries ago when he wrote his Republic. For a time he actually thought he had found a solution. He prevailed upon the King of Syracuse to adopt his plan and put it into operation. The King tried it for a while, tired of it and sold Plato into slavery. Some good friends ransomed him. After that he was not so sure that his scheme would work in practice. Things are not much different today than they were in the time of Plato—only worse. Worse because of the increase in population, resulting in larger governmental units, the enormous increase in the number of those exercising the franchise, the increase in the percentage number of ignorant voters and the ever increasing astuteness and finesse of our practical politicians.

Inefficiency and corruption is so common that we have become callous to it. We are annoyed by it, we grumble and complain mildly about it, we pay our ever mounting taxes if we have anything with which to pay and "let it go at that." It almost seems as though we humans had adopted David Harum's dog philosophy and were applying it to ourselves. He said:

"A certain amount of fleas is good for a dog, it keeps him from brooding on being a dog."

The best illustration of governmental muddling in general is to be found in the mess most governments of the world have made of themselves during the past twenty years. As examples, we need but call attention to the virtual bankruptcy of Germany and of Austria, the maladministration in Russia, the revolutions in Spain, China, Central and South America, the dictatorships in Poland and Italy, and, when we come nearer home, the general lawlessness in the United States with its murders and kidnapping for ransom; conditions in the city of New York as disclosed by the Seabury Investigation; the virtual bankruptcy of Chicago and Philadelphia, and the near bankruptcy of many other governmental units.

Let us study conditions in our own country a little more in detail in order to determine whether it would be wise or even safe to entrust the federal, state and local government, or any one of them, with supervision over the private lives of its citizens. (This phase of the problem will be taken up more in detail in the future installments.)

NOTE ON MIGRAINE

E. C. HARTLEY, M.D.

Saint Paul

Clendening* refers to a number of writers who comment upon duodenal and upper intestinal tract stasis during attacks of migraine. He himself says: "This condition of stasis, however, has long been known and the feeling is peculiar to all sufferers of the disease. A fair proportion of them know that if they get a cathartic, or some analgesic drug such as aspirin, in the stomach during the prodromal stage they may abort an attack, but if they wait until this attack is in full swing, any medicine which is swallowed will stay in the stomach and later be vomited. Translating these clinical facts into physiologic language, it means that if the drug is taken before the gastrointestinal stasis occurs, then it will be moved into the intestines and absorbed and thus have some action, but if taken later when the gastric and intestinal musculature is paralyzed, no absorption occurs."

Obviously, any symptom which appears early enough to mark the point at which medication could be taken early enough to insure its absorption will be of primary value in effective treatment. The writer (whose chief interest in migraine is the fact that he has felt its cyclic visits with considerable gloom) has identified one symptom which satisfactorily marks this point in himself; upon inquiry among friends similarly afflicted, the same symptom was recognized.

This symptom, marking the point at which oral medication may be taken with a reasonable hope of relief, is a sensation of gagging; the patient makes efforts to clear his throat, not violently or excessively, but still definitely enough so that he will recall the sensation if asked about it, but, as a rule, not otherwise. Once recognized the patient must not delay taking his medicine, for gastric inertia invariably sets in within a short time and the attack will run its customary course.

Calcium in various forms has been used for some time in the treatment of migraine. The writer has found that calcium gluconate, one or two heaping teaspoonsfuls in water, will uniformly abort an attack. All that is felt is a sensation of tiredness, not unpleasant; there is no nausea, vomiting, depression or headache.

*Clendening: *Modern Methods of Treatment*. 4th Edition. C. V. Mosby Co.

THE BACTERIOLOGY OF LISTERINE OR WAS THE LANCET REPORT RELIABLE?

According to the Lancet (London) report: "The actual number of micro-organisms killed in 15 seconds by undiluted antiseptic exceeds that claimed by manufacturer," that is, 200,000,000 in 15 seconds. Such a statement means little. The Lancet report does not bring out what the A. M. A. report does: diluted Listerine is no more bactericidal than water. Even full-strength Listerine is an exceedingly weak germicide. (Jour. A. M. A., November 14, 1931, p. 1467.)

REPORTS AND ANNOUNCEMENTS OF SOCIETIES

MEDICAL BROADCAST FOR THE MONTH

The Minnesota State Medical Association Morning Health Service.

The Minnesota State Medical Association broadcasts weekly at 11:15 o'clock every Wednesday morning over Station WCCO, Minneapolis and Saint Paul (810 kilocycles or 370.2 meters).

Speaker: William A. O'Brien, M.D., Associate Professor of Pathology and Preventive Medicine, Medical School, University of Minnesota.

The program for the month of March will be as follows:

March 2—Personal Hygiene—Fresh Air and Sunshine.

March 9—Cleft Lip and Palate.

March 16—Prevention of Bronchiectasis.

March 23—Fracture of the Spine.

March 30—How Does Cancer Begin?

AMERICAN COLLEGE OF PHYSICIANS

The sixteenth annual Clinical Session of the American College of Physicians will be held in San Francisco the week of April 4, 1932.

The program will include some sixty addresses covering the more recent advances in the field of internal medicine. Among other medical subjects which will be discussed will be the following: hypertension, pulmonary arteriosclerosis, edema, leukopenia, arthritis, and diseases peculiar to the West Coast. The recent outstanding progress in our knowledge of the involuntary nervous system will be presented.

Clinics in the various local institutions will occupy the morning hours. History of medicine which has received growing interest of late will occupy one of the morning sessions.

While the session is intended for Fellows and Associates of the College, an invitation is extended to all physicians to attend. The guest fee of \$15.00 includes a year's subscription to the Annals of Internal Medicine in which the papers will be published. General practitioners as well as internists will find the meeting profitable.

Dr. S. Marx White, Minneapolis, is the incumbent president and Dr. George Morris Piersol, Philadelphia, the general secretary.

MINNESOTA STATE MEETING

Technical exhibits will be the center of interest during a large share of program time at the 1932 meeting of the Minnesota State Medical Association and the Minnesota State Hospital Association scheduled for May 23, 24 and 25 at the new St. Paul Auditorium.

This will be the largest joint meeting of medical and hospital personnel ever gathered in the Northwest. Representatives of eight states, including Montana

North and South Dakota, Nebraska, Wisconsin, Iowa, Wyoming and the Winnipeg Medical Society of Manitoba, Canada, have already indicated an intention to attend.

The enlarged scope of this meeting which, in its scientific and technical exhibits and its demonstrations as well as in one large joint evening meeting takes in both great associations, has occasioned a number of program departures.

One special feature of the 1932 arrangement calls for two one hour sessions each day and an open Monday evening session in the technical exhibit hall. This is for the especial purpose of giving every visitor a chance to examine all exhibits. The most interesting program novelty will undoubtedly be the forty table demonstrations to be held during the two one hour exhibit hall sessions. These demonstrations are to be sufficiently varied in subject to interest everybody, and those who are not attending the demonstrations may take advantage of the time to study the scientific and technical exhibits. These last are to be especially emphasized at this meeting.

Twice daily the demonstrations will be conducted from 10:00 to 11:00 A.M., and from 2:00 to 3:00 P.M., by twenty of the best qualified men in the state. The Committee on Clinical Demonstrations and Exhibits announces that it is taking every care to guard against any repetitions or overlapping in subjects. Among those selected to date are: Fungi; the Ascheim-Zondek Test; the Electrocardiograph; Undulant Fever; the Allergic Skin Test; Urine Typing of Pneumonia; X-ray of Juvenile Tuberculosis; Gallbladder Technic; the Tuberculin Skin Test; Cauterizing the Cervix; Brain Model; Localization; Ulcer X-ray; Eyegrounds; Fracture Demonstration. Final choice of those who are to give the demonstrations will be made at the February meeting of the Committee on Scientific Assembly.

Both scientific and technical exhibits will have the benefit of the unusual space and presentation facilities of the new Auditorium. The committee in charge already reports an unusual number of entries. The gold medal for the best scientific exhibit will be offered again for the third consecutive year by the Southern Minnesota Medical Association. This medal was won in 1930 by Dr. Leo Rigler, University of Minnesota, and in 1931 by Dr. William P. Herbst of Minneapolis and Dr. R. K. Ghormley of Rochester. Competition is expected to be keen in 1932 for this medal.

A series of six clinical pathological and clinical radiological conferences has been arranged as another 1932 novelty for the Monday afternoon program. Drs. E. L. Tuohy of Duluth, Harold Robertson of Rochester, John Noble of St. Paul, B. R. Kirklin of Rochester, and Leo Rigler have already been assigned to conduct the conferences, each of which will occupy forty minutes of program time.

Hospitalization and Medical Care of Veterans will be discussed before a large joint meeting of the hospital and medical associations Monday night in the theater of the Auditorium. Speakers for this meeting which is to represent hospital men, the medical profession

and lay trustees of hospital boards include the Reverend Father Alphonse Schwitilla, president of the Catholic Hospital Association; Mr. F. R. Bigelow, president of the St. Paul Fire and Marine Insurance Company; Mr. E. V. Cliff, Ortonville, National Executive Committee member of the American Legion; and, if his engagements permit, Dr. Olin West, secretary of the American Medical Association, Chicago.

IOWA STATE MEDICAL MEETING

The members of the Minnesota State Medical Association are cordially invited to attend the annual session of the Iowa State Medical Society, to be held in Sioux City, Iowa, May 4, 5 and 6. The program, which is an especially strong and interesting one, begins at 8:00 a. m. on Wednesday, May 4, and concludes at noon on Friday, May 6. There will be an hour and a half of medical and surgical clinics, and symposia upon the following subjects are included in the program: kidney, blood diseases, neurological conditions, cancer, and pediatrics.

Presentation of a membership card in the Minnesota State Medical Association will admit any physician from this state to full privileges in all scientific sessions.

MINNESOTA RADIOLOGICAL SOCIETY

At the winter meeting of the Minnesota Radiological Society, held at the University Hospital in Minneapolis on Saturday, February 13, 1932, the following program was presented:

CLINICAL-PATHOLOGICAL-RADIOLOGICAL CONFERENCE

Conducted by Dr. W. A. O'Brien

Assisted by Drs. B. Pearson, O. Randall, R. Koucky
1. Ewing's Sarcoma of Bones

Discussion by Drs. W. Cole, C. Hansen

2. Multiple Myeloma with Intestinal Obstruction

Discussion by Dr. O. H. Wangensteen

3. Carcinoma of Breast with Multiple Metastases

Discussion by Drs. K. Stenstrom, O. Campbell, L. Rigler

4. Carcinoma of Antrum with Peripheral Metastases

Discussion by Drs. W. Peyton, K. Stenstrom

Relative Value of Stereoscopic and Single Films in the Routine Examination of the Chest—Dr. Frederick B. Exner

Studies on the Routine Examination of the Chest in Students—Dr. Harold Diehl

Anomalous Lobes of the Lungs—Dr. L. G. Erickson

Observations on Intra-pleural Pressure in Massive Pulmonary Atelectasis—Dr. Rudolph Kocky

Radiation Therapy of Neuritis—Dr. John J. Eneboe

Fractures of the Sesamoids—Dr. Jacob Sagel

Methods of Radiation Therapy of Carcinoma of the Esophagus—Dr. C. O. Hansen

Intrapерitoneal Herniae, Preliminary Report—Dr. Frederick Exner

The Use of Thorotrust in Roentgen Diagnosis, Preliminary Report—Dr. L. G. Erickson

ADDRESSES

The Recent Literature on the Classification and Treatment of Bone Tumors—Dr. W. A. O'Brien, Professor of Pathology, University of Minnesota

Cholecystographic Studies on the Emptying of the Human Gall Bladder—Dr. E. S. Boyden, Professor of Anatomy, University of Minnesota

The next meeting of the Society will be held in Saint Paul, May 23, 1932.

RICE COUNTY SOCIETY

The Rice County Medical Society met February 12, at the Blue Bird Inn at Faribault as guests of Dr. and Mrs. D. W. Francis. The affair was given in honor of Captain O. T. Francis, U. S. M. C., brother of Dr. Francis, who has been in command of the government radio station in Shanghai for the past two years.

Mr. Lester Swanberg reviewed recent news from the Far East, and Captain Francis talked about China.

Dr. C. W. Plonske, secretary-treasurer, presented his annual report showing 100 per cent membership in the society and a balance of \$115.29 in the society treasury.

WOMEN'S AUXILIARY

Minnesota State Medical Association

President—Mrs. James Blake, Hopkins
Chairman Press and Publicity—Mrs. Glen R. Matchan,
Minneapolis
Editor—Mrs. Horatio B. Sweetser, Jr., Minneapolis

WEST CENTRAL MEDICAL AUXILIARY

The mid-winter meeting of the West Central Medical Auxiliary was held at the Merchants' Hotel at Morris, January 13. The program included an explanation of the Shoulders Bill, given by Mrs. Herman Linde of Cyrus. Two new members, brides of this fall, joined the Auxiliary.

HENNEPIN COUNTY MEDICAL AUXILIARY

At the January meeting the Woman's Auxiliary of the Hennepin County Medical Society voted a three hundred dollar student loan fund for medical students at the University of Minnesota, this fund to be administered by the Dean of the University. Dean E. E. Nicholson of the University came to the meeting and explained the method of handling such funds. At this meeting Mrs. Walter Marcey gave a very interesting talk on international relations, with some discussion of the disarmament conference.

RAMSEY COUNTY MEDICAL AUXILIARY

To raise money for their Student Loan Fund, the Ramsey County Medical Auxiliary held a card party, Friday, February 5, in the County Society rooms.

The members are busy making arrangements for the coming State meeting to be held in Saint Paul in May.

PROCEEDINGS OF THE MINNE SOTA ACADEMY OF MEDICINE

Meeting of Dec. 9, 1931

The regular monthly meeting of the Minnesota Academy of Medicine was held at the Town and Country Club on Wednesday evening, December 9, 1931. Dinner was served at 7 o'clock, and the meeting was called to order at 8 o'clock by the President, Dr. J. S. Gilfillan.

There were 47 members and 1 guest present.

Minutes of the November meeting were read by the Secretary and approved as read.

The annual election of officers was held, resulting as follows:

President, Dr. J. C. Litzenberg, Minneapolis.

Vice President, Dr. C. D. Freeman, St. Paul.

Secretary-Treasurer, Dr. R. T. LaVake (re-elected).

The scientific program of the evening was as follows:

Dr. A. E. WILCOX (Minneapolis) reported a case of "Traumatic Subcapsular Hemorrhagic Cyst of the Spleen" as follows:

The patient, H. H., age 26, reported July 31, 1931, complaining of pain in the upper left quadrant along the costal margin.

His immediate history was that in the morning of the above date he was carrying a crate of machinery and struck his left side against the edge of a table. His symptoms did not seem to be severe; in fact, he came for observation at the insistence of his employer and not on account of the severity of his symptoms. Physical and X-ray examinations were negative and the condition was considered of a trivial nature and diagnosed as a contusion of this area. He continued to work, but reported at the office five times the following month, during which time he was still at work, but complained periodically of some pain in his side.

On September 14, 1931, in the evening, he noticed for the first time a swelling below the left costal margin and the pain increased. The following day he reported at the office, at which time a palpable swelling was noted occupying a position below the left costal region. The swelling appeared to be four or five inches in diameter and the mass was tender and marked friction rub was noted on deep breathing and definite dullness on percussion. The mass was smooth and round, but gave to the palpating hand the sense of fluctuation. The clinical impression was enlarged spleen.

X-ray studies were made and the report was as follows: "Fluoroscopic examination was made of the stomach and duodenum following the ingestion of a barium meal. The stomach is displaced markedly towards the right so that it lies almost in the midline with also marked displacement anteriorly by a mass which bulges in the left upper quadrant and which apparently also causes a splinting and elevation of the left diaphragm. The stomach and duodenum otherwise are normal. Films were made of the abdomen with the barium-filled stomach. The marked displacement of the stomach is again demonstrated. The mass occupies the entire left half of the abdomen with the

stomach displaced well beyond the midline. The kidney shadow can be fairly well made out although it does appear to be somewhat enlarged. The shadow of the psoas muscle can also be differentiated, but is somewhat overshadowed by the abdominal mass. The nature of the mass can not be further determined. Its location and possible association with trauma would indicate that it represents a retroperitoneal hemorrhagic cyst. This type of appearance is occasionally associated with a large hydronephrosis so that the process may be in the perirenal region. I do not think it arises in the spleen. At 24 hours the transverse colon shows marked downward displacement including the splenic flexure. The entire study most strongly suggests a retroperitoneal mass."

"Conclusions:

1. Large left abdominal mass.
- a. Possible retroperitoneal hemorrhagic cyst with or without involvement of the kidney capsule.
- b. Possible large hydronephrosis.

"Films were made of the region of the kidneys. The right kidney is entirely within normal limits. The left kidney appears to be definitely enlarged and its outline fuses with the large mass palpable in this region from which its contours can not be separated. These films show some obliteration of the psoas shadow, but there is no evidence of spasm of the psoas muscle. This study suggests the same conclusions as on the previous examination and most strongly indicates a kidney mass."

On September 17, 1931, the patient was admitted to the hospital. Temperature was normal, pulse 85, respiration 18. Urine was negative. Hemoglobin 70 per cent. Erythrocytes 4,156,000, leukocytes 10,800, P. M. N's 70 per cent, large lymphocytes 18 per cent, small lymphocytes 12 per cent. Other general physical examination appeared to be negative and unimportant.

Revised pre-operative diagnoses were:

1. Hemorrhagic cyst of spleen, traumatic.
2. Retroperitoneal hemorrhage.
3. Hydronephrosis.

An exploration was advised. Under spinal anesthesia, 200 mg. novocaine, supplemented with nitrous oxide, a left rectus incision was made. When the peritoneum was opened a large, smooth, cystic tumor which proved to be the spleen was found. The spleen grossly appeared about the size of an adult's head. There were marked adhesions to the anterior peritoneal wall, diaphragm, omentum, and stomach. These adhesions were carefully separated and with considerable difficulty, and this only after rupturing of the capsule and allowing some of the encysted fluid to escape. The pedicle of the spleen was gradually isolated and ligated in sections with chromic catgut, being careful to avoid important surrounding structures, mainly the tail of the pancreas and stomach. Some of the adhesions bled sufficiently to warrant ligation of the stumps, but in general the field was fairly dry when enucleation was completed. The abdominal wound was closed in tier sutures without drainage, no other pathology having been encountered.

The post-operative period was uneventful and, with the exception of hypodermoclysis and sedative for pain, no difficulties were encountered. Wound healed by first intention. Patient left the hospital, October 1, 1931, and returned to work November 9, apparently free from symptoms.

The specimen presented shows a spleen weighing 360 grams, after the fluid was removed. Before the capsule was ruptured, as stated above, the appearance was about the size of an adult's head and undoubtedly contained approximately two quarts of fluid. The capsule is markedly thickened and shows evidence of marked adhesions.

Final impressions were that there had been a contusion of the spleen followed by slow, progressive hemorrhage or that there had been a secondary hemorrhage which accentuated his symptoms at this late date. However, the thickened capsule would suggest that the affair had been slowly progressive from the start.

The patient was of the tall and markedly asthenic type, in which the spleen may occupy a position below the costal margin, making exposure and susceptibility to trauma more marked.

DISCUSSION

DR. F. E. B. FOLEY (St. Paul): In the first place I would like to congratulate Dr. Wilcox on two points: first, on the presentation of such an unusual case, and second, on having put the spleen first in the order of possible diagnoses.

I am interested particularly from the standpoint of the differential diagnosis between the condition found by Dr. Wilcox and a process in or about the kidney.

His remarks concerning the roentgenologic examination of the kidney are worthy of some comment. It is said that accumulations around the kidney obliterate the psoas shadow. In twenty-five or thirty cases of perinephric abscess which I have observed, the psoas shadow was obliterated almost regularly. On the other hand the psoas shadow may be obliterated in the absence of perinephric abscess, inflammation or hemorrhage. Any process that gives an increased density over the psoas border, such as hydronephrosis, renal tumor or solitary cyst, may obliterate the psoas shadow. Finally the psoas outline may fail to show even in good films in the absence of any pathologic process whatever. For these many reasons the sign is of dubious value and not to be relied upon.

The really valuable criterion in differential diagnosis would be a pyelogram. I did not understand that a pyelogram had been made in this case and without one I rather marvel at Dr. Wilcox's diagnostic acumen in having recognized this as a tumor of the spleen.

DR. IRVINE MCQUARRIE (Minneapolis) read his Inaugural Thesis entitled, "Some Recent Observations Regarding the Nature and Treatment of Epilepsy in Children."

I wish to thank the Academy for the honor of my election to membership. It is a pleasure for one to belong to a group such as this, which is composed of men representing all branches of medicine and surgery.

ABSTRACT

The results of some recent studies on the blood lipids and on the mineral and water exchanges in epileptic children were presented. It was shown that under certain conditions cessation of grand mal seizures in severely epileptic children follows the establishment of a deficit in the body water, whereas rehydration rather promptly leads to their recurrence. Data were presented to show that typical seizures can be induced at will in a high percentage of mildly epileptic patients during their usual intervals of freedom from attacks and while they are on relatively high water and low mineral intake by sustained pituitary antidiuresis. Convulsions usually occur under these conditions only after the amount of water retained is equal to from two to five per cent of the body weight. That dilution of the extracellular body fluids under these conditions is an important factor in the induction of seizures is indicated by the fact that a low mineral intake favors their occurrence, whereas ingestion of just sufficient NaCl to prevent dilution tends to interfere with the reaction.

In one case of severe epilepsy in which seizures were temporarily under control as a result of the dehydration regimen, rehydration was repeatedly found to be accompanied by both a relative and an absolute increase in the excretion of potassium. A reversal of the urinary potassium to sodium ratio regularly appeared even before the seizures occurred. Pituitary antidiuresis accentuated this reaction, whereas luminal had an opposite effect.

While studies on the blood lipids revealed no clear-cut relationship between the occurrence of seizures and the absolute level of either cholesterol or lecithin, they definitely indicated that the lecithin to cholesterol ratio tends to be highest in samples taken nearest to the time of seizures. These data, together with the foregoing, were tentatively interpreted as suggesting that there is an inherent defect in the mechanism for controlling the permeability of the brain cell membranes in epilepsy. Therapeutic implications from such an interpretation were discussed. The circumstance that most of the conditions which favor the occurrence of seizures, such as alkalosis, anoxemia, superhydration and excitation, are likewise known to increase cell membrane permeability, and that factors which prevent them, such as sedation and narcosis, cause decrease in permeability, lends support to this general thesis.

DISCUSSION

DR. E. M. HAMMES (St. Paul): Doctor McQuarrie has presented this interesting experimental work on epilepsy in a most fascinating way. The more I hear about the theories on the etiologic factors in essential epilepsy, the more confused I become.

When Temple Fay brought forth his dehydration treatment, because of increased spinal fluid findings in epilepsy, we felt that at least an important mechanical factor had been solved in this very obscure problem. However, there are many clinical experiences which are difficult to explain on any of these theories. It is a well known fact that an epileptic will be free

from convulsions for months and months following some surgical procedure, regardless of what or where the operation was, and then have a recurrence of his convulsions without any apparent cause. Reed of Cincinnati demonstrated that in a large number of epileptics, in whom he removed the colon without obtaining any permanent results.

Furthermore, epileptics frequently have a complete cessation of convulsions for months with or without treatment, and then suddenly develop a status epilepticus.

It is difficult to explain these facts with any theory that has been suggested. I would like to ask Doctor McQuarrie if his experimental work was limited solely to cases of grand mal, or if some studies have been made in cases where the convulsions were only of the petit mal type.

DR. J. C. MCKINLEY (Minneapolis): I should like to ask Dr. McQuarrie how far he would go in applying his ideas on the etiology of the so-called essential epilepsy to symptomatic epilepsy, that is to epilepsy secondary to tumors, meningeal inflammations, and things of that sort.

We are to be complimented in having such work as this going on in our community. Whether or not we agree that Dr. McQuarrie has uncovered the true etiologic factors is wholly aside from the question. He is showing us some phenomena of fundamental importance that are going on in our epileptics and is giving us at least a working hypothesis until sufficient facts can be accumulated to round out our conception of the disease.

DR. MCQUARRIE (in closing): Petit mal cases do not seem to behave exactly like the others. So far we have confined our study chiefly to cases predominantly of the grand mal type. In the former a typical attack may occur while the nurse is out of the room for a moment and so may go unobserved, but if a patient has a grand mal seizure no doubt exists regarding its occurrence. I am under the impression that the mechanism is somewhat different in these two convulsive reactions. The patients upon whom the effects of the special therapeutic regimen were studied were chiefly those having many convulsions daily because it is from these alone that one is justified in drawing conclusions unless very long periods of observations are used. What occasionally occurs when a severely epileptic patient is placed upon a forced fluid regimen is a washing out of minerals with a resulting net loss in body water. This effect may be responsible for the decrease in the number of seizures. When water is stored under similar conditions convulsions are likely to recur.

It is true that in occasional instances patients stop having seizures after undergoing operative procedures of various sorts. On the other hand, if one expects such a result with any degree of frequency one is likely to be disappointed. The multiplicity of minor factors which apparently influence the course of this disease cannot be explained until more has been learned regarding its underlying pathological physiology. The permeability of the living cell membrane is not constant, but is known to vary in degree from time to time, probably in accordance with the state of nu-

trition of the cell, its oxygen supply, the PH of its environment, etc. It is possible that some of the minor provocative factors, such as fright or reflex irritation from certain pathological lesions, influence brain cell permeability in the direction favoring the occurrence of convulsions.

In regard to Dr. McKinley's discussion, he knows much more about that than I do, I am sure. I have no explanation of the fact that some persons have convulsions from head injuries. It is said that epilepsy developed in but 5.4 per cent of the cases of head injury during the war. Since the incidence of epilepsy in the general population is around 0.4 per cent there must be many more persons who have the characteristic underlying defect in their nervous makeup but who do not have convulsions until they have some brain injury. It is difficult to explain on any other ground the fact that a given circumscribed lesion, such as a brain tumor, abscess or traumatic scar, appears to cause seizures in but a minority of cases.

DR. F. E. B. FOLEY (St. Paul) gave a lantern slide talk on "The Embryology and Surgical Correction of Certain Renal Malformations" and reported three cases of horseshoe kidney operated.

DR. E. A. BOYDEN of the Department of Anatomy at the University of Minnesota discussed the embryological development of anomalies of the kidney.

The meeting adjourned.

R. T. LAVAKE, M.D., Secretary.

PROCEEDINGS OF THE MINNEAPOLIS SURGICAL SOCIETY

Meeting of January 7, 1932

The regular monthly meeting of the Minneapolis Surgical Society was held in the Lounge on the 30th floor of the Medical Arts Building on Thursday evening, January 7, 1932.

The meeting was called to order at 8 p. m. by the President, Dr. J. Frank Corbett. There were 31 members and 6 visitors present.

The following scientific program was presented.

DR. E. A. REGNIER reported a case of "Acute Pancreatitis Secondary to Common Duct Obstruction" as follows:

Mr. S. S., age 35, No. 8582, was admitted to General Hospital on surgery service on September 5, 1931, at 8:00 p. m. He complained of severe pain in the epigastrium, with nausea and vomiting. The patient was well until 8:30 A. M. on the day of his admittance. At 8:30 A. M., while cranking his car, he was suddenly seized with a severe pain in the epigastrium. He collapsed. The pain remained until 11:00 A. M., but eased up about this time. About one hour later the pain returned

with increased severity and he vomited many times. He called a doctor, who gave him morphin and sent him to the hospital.

His past history is negative except for vague gastrointestinal distress during the past two years. He had had gallbladder studies a year ago in Chicago but was told that he had no gallbladder disease.

Physical examination reveals a very acutely ill patient. There was no jaundice; temperature 101.4°, pulse 116, respiration 34, blood pressure 124/72. The pupils were equal and regular. There was much dental caries. No abnormal adenopathy. Heart and lungs were normal. He showed boardlike rigidity over the entire abdomen. Palpation over any portion of the abdomen seemed to increase the pain in the epigastrium. There were no masses felt. Rectal examination was negative. W.B.C. 23,000. P.m.n.'s 93%. Urine negative.

Diagnostic impression: perforated ulcer, pancreatitis.

Operation: Under spinal anesthesia the abdomen was opened through the upper right rectus incision. There was a copious quantity of bile-stained fluid in the abdomen. The stomach and duodenum were normal. There were numerous areas of fat necrosis about the peritoneum and the mesenteries of the intestine. There was an extreme degree of edema of the pancreas and surrounding tissues. There was no hemorrhagic exudate. The gallbladder was tense and slightly thickened. There was a hard mass, palpable, in the region of the common bile duct. The duct was incised and several stones ranging from $\frac{1}{2}$ to one cm. were removed. The stones were faceted. A "T" tube was inserted in the common duct for drainage. The gallbladder was opened and a great many stones were removed. The gallbladder was closed and left in place. A Penrose drain was inserted down into the foramen of Winslow.

Postoperative diagnosis: (1) common duct obstruction; (2) acute pancreatitis with fat necrosis; (3) gall stones; (4) chronic cholecystitis.

The immediate postoperative condition was quite stormy. The patient had typical postoperative asthenia as described by Whipple. He was given daily intravenous injections of glucose and after about ten days he began to improve quite readily. The "T" tube was removed the third week following the operation. The patient was discharged from the hospital on October 16, 1931, at which time the wound was practically healed. It is now four months since the operation and the patient has gained 35 pounds in weight.

DR. ROBERT SCHWYZER read his Inaugural Thesis, entitled "Pancreatitis, with Report of Cases."

ABSTRACT

A case of acute pancreatitis with fat necrosis and sanguinolent exudate in the peritoneal cavity is presented. It is interesting because its onset was not as stormy as usual and was not preceded by a history of gallbladder disease. The biliary system at operation was found to be normal. Simple drainage of the lower cavity was done and the patient recovered.

In the discussion of *etiology* the various factors, such

as obstruction of the pancreatic duct, regurgitation of bile and extension through the lymphatics, are considered; laying stress on the fact that acute pancreatitis may follow many infections in the body, and especially epidemic parotitis.

The *symptomatology* is studied of 382 cases collected from the literature of the last ten years. Females prevail with 65 per cent. Biliary disease was present in 71 per cent, occlusion by stone in none. Pain was found constantly, mostly located in the epigastrium, postprandial in cases accompanied by gallbladder. Tenderness, pathognomonic when localized in left hypochondrium, was absent in a few cases. Rigidity is never very marked. Vomiting occurs in nearly 100 per cent and is described as incessant. Cyanosis and shock, important in the differential diagnosis, were present only in about 40 per cent of the cases. The prognosis of these is bad. Icterus was found in 30 per cent. Pulse and temperature are variable. Kidney function is often impaired; glycosuria and hyperglycemia are rare.

Leukocyte count increased, relative increase of the polynuclear not characteristic. Increase of diastase in the blood is of no value, while increase of diastase in the urine to 250 units or more is of help in the differential diagnosis, but failures up to 20 per cent of cases have to be considered.

Pathology varies from edema to destruction of the gland. Fat necrosis is mostly present, the exudate in 72 per cent. This is primarily mostly sterile.

Complications: cyst, abscess, extension of fat necrosis to pleura, embolic abscesses of the liver.

Difficulty in exact differential diagnosis.

Extent of surgery depends on findings; biliary surgery only in light cases, in late cases drainage of gland.

Postoperative complications: arrosion of skin and fistula, hemorrhage.

Sequelæ: asthenia, diabetes, and chronic pancreatitis.

Recurrences: not uncommon, especially in cases complicated by gallstones.

Mortality: 55 per cent for all cases. Less in cases with edema of gland only, greater when necrosis is present. In exudate cases, prognosis worse.

Early operation treatment of choice despite publication of Mikkelsen, only 7 out of his 50 cases proven by biopsy or autopsy.

Comment: Prevention is increased by early biliary surgery. Cases operated on early give better prognosis. Limited surgery indicated in cases with peritonitis. Intervention preferable to conservatism.

DR. O. H. WANGENSTEEN gave a paper on "Acute Pancreatic Necrosis with Comments on Diagnosis and Therapy" (to be published elsewhere).

ABSTRACT

Dr. Wangensteen stated that he would like to preface his remarks by stating that no one is infallible in the differential diagnosis of acute disasters of the abdomen. It was his impression, until some years ago, that acute pancreatitis was heralded by the appearance of shock, a rapid pulse, and cyanosis. Six years ago he saw his first clinical case of acute pancreatic necrosis. It con-

cerned a woman aged 39, the mother of four children. She complained of diffuse severe abdominal pain and gave a history of several attacks of upper right quadrant pain that seemed to be best interpreted as attacks of gallbladder disease. The pulse in this attack was 90, the temperature 100.4° F., and the blood pressure was normal. The pain was severe, but the patient did not look especially ill. On examination of the abdomen, tenderness and rigidity about 2+ were found to be present everywhere. There was no greater rigidity in the region of the gallbladder than elsewhere. Rectal and pelvic examination was negative. A diagnosis of acute cholecystitis (probably empyema) with threatening inundation of the peritoneal cavity was made, though this diagnosis was not satisfactory in the absence of greater rigidity over the upper rectus muscle. At operation, performed under a combination of local infiltration and nitrous oxide anesthesia, the correct diagnosis of acute pancreatic necrosis was established on entry of the peritoneal cavity by the presence of fat necrosis and an abundant brownish sanguinous fluid. The peritoneal cavity was drained, as was the gallbladder, several gall stones being simultaneously removed. The pancreas was found to be soft and fiery red; its capsule was split and large gauze tampons were led down to the pancreas through both the gastro-hepatic and gastro-colic ligaments. The next morning the patient's condition was fair, though the blood pressure was somewhat depressed and slight cyanosis of the finger tips was present. About sixteen hours after operation she presented the classical text-book picture of acute pancreatitis. She was deeply cyanosed and shock was extreme. There was blood in the vomitus and in the urine. Necropsy examination showed hemorrhages in the intestinal canal, the lungs, kidneys, and other tissues. Undoubtedly there was trypsin in the blood stream.

About a year later, another patient, presenting the same picture as detailed in the above case record, was seen. There was but slight elevation of the pulse, and moderate temperature rise. The patient complained of severe abdominal pain and physical examination revealed diffuse abdominal tenderness and rigidity of about 2+ to 3. A diagnosis of acute pancreatic necrosis was made and confirmed at operation. The same operative procedure was performed as in the first case, with the same outcome.

To date, four patients, Dr. Wangensteen stated, have been operated upon with the same outcome in each instance. Two of these survived for as long as sixteen days.

In April, 1931, a woman, aged 33, was observed at the University Hospital presenting the picture outlined above. A diagnosis of acute pancreatic necrosis was made and conservative therapy carried out. Somewhat more than three weeks later, at which time all of the abdominal symptoms had subsided and the patient was ambulant and eating well again, exploration was done. Many areas of fat necrosis as large as the thumb nail were still scattered throughout the upper abdomen. The gallbladder contained numerous stones and was excised. The patient convalesced uneventfully and has remained

well. The instance of an adult male was then related in which a diagnosis of acute pancreatic necrosis was also made and delayed operation performed about a month later. Scattered areas of fat necrosis were still present throughout the mesenteries and a small mass was palpable in the mid-portion of the pancreas. The gallbladder was excised; it contained no stones, but a microscopic diagnosis of cholesterosis was made by the pathologist. The patient had a smooth convalescence and has remained well.

The conditions that must be differentiated from acute pancreatic necrosis, Dr. Wangensteen stated, were (1) acute appendicitis with peritonitis, (2) twisted ovarian cyst, (3) acute bowel obstruction, especially strangulation types of obstruction, (4) acute lesions of the gallbladder, (5) perforation of a duodenal or gastric ulcer.

Perforation of a hollow viscus in the upper reaches of the intestinal canal, Dr. Wangensteen went on, are heralded by a board-like rigidity of the abdomen. There is usually, however, no shock in the true sense for the pulse and blood pressure are usually normal despite the apparent prostration of the patient. The sudden onset and collapse of the patient may be very much the same in both conditions, but the rigidity is much greater in perforation, and gas can always be visualized beneath the diaphragm on the fluoroscopic table when the patient is brought into the erect posture.

The differential diagnosis of acute gallbladder lesions and pancreatitis was brought out above in recitation of the case histories.

Dr. Wangensteen said that most of the cases of acute pancreatic necrosis seen by him had been diagnosed acute intestinal obstruction because of the intense vomiting. The only varieties of bowel obstruction that would come into consideration are those types presenting tenderness, viz: the strangulation obstructions. Dr. Wangensteen felt that the recognition of acute bowel obstruction was one of the simplest of abdominal diagnoses. The concomitant occurrence of intermittent crampy pain at the acme of which loud borborygmi are heard with the stethoscope establishes the presence of intestinal colic. In pancreatic necrosis the abdomen is ominously silent on auscultation.

In twisted ovarian cyst, the pelvic findings usually predominate; in the cases of acute pancreatic necrosis observed by Dr. Wangensteen, the rectal and pelvic findings have been uniformly negative.

Acute appendicitis may be confused with almost any acute disorder of the abdomen. The onset is usually not as abrupt as in pancreatitis. Patients with appendicitis presenting diffuse abdominal rigidity are usually manifestly ill and the pulse would be found to be 120 and not 90 or less, as in most instances of acute pancreatic necrosis. Greater rigidity is usually present over the appendix and there is definite tenderness on rectal or vaginal examination.

With reference to treatment, Dr. Wangensteen said, the first case of acute pancreatic necrosis was successfully operated upon in 1890 by the late Halsted of Baltimore. He merely noted the findings, established the diagnosis and closed the abdomen. About ten years

later, Hahn of the Friedrichshain hospital in Berlin operated successfully upon a second case. He drained the peritoneal cavity and attributed the recovery of the patient to this measure. In 1901, Halsted operated unsuccessfully upon the case in which Opie found a small stone impacted at the ampulla of Vater, which case has been the starting point of considerable investigative work relating to acute pancreatic necrosis. Whipple and a number of other investigators have since shown that the fluid in the peritoneal cavity is innocuous in pancreatitis and need not be drained off. In 1909, V. Haberer advocated routine drainage of the gall bladder in case of acute pancreatitis on the supposition that a block was present in the ampulla in most cases, the cholecystostomy serving as a drainage vent. A number of statistical studies have adequately shown that in only about 4 per cent of instances is a stone present in the ampulla; in about 14 per cent common duct stones are present. The generally accepted orthodox procedure in dealing with acute pancreatitis surgically is to place a gauze tampon down to the pancreas to permit the escape of the active ferment, trypsin.

It is readily apparent that there is no specific help in any of these types of procedure done at operation. Patients with acute pancreatic necrosis die of tryptic digestion of the pancreas. Trypsinogen is activated within the pancreas instead of by the physiologic activator, succus entericus, within the bowel. Splitting the pancreatic capsule or placing a tampon down to the pancreas would not appear to influence appreciably the process in the pancreas for recovery. Most instances of acute pancreatitis are a chemical digestion and not inflammatory in nature. Our therapeutic measures would appear to be better directed toward stopping the activation of trypsinogen within the gland itself. True enough, very little is known about the method of approach to the problem, but investigations along this line promise to be more productive of results than operation that accomplishes nothing specific.

Only in those instances in which jaundice is present or when the diagnosis remains in doubt should operation be performed. It is to be recalled that Halsted failed to find the stone at the ampulla in his case, now famous through the report of Opie, despite the fact that he opened and probed a dilated common duct. He frankly stated that he believed that he shortened the patient's life by operating.

If there be any common denominator of acute pancreatic necrosis it is gall stones or chronic disease of the gallbladder, one of these conditions being present in about 70 per cent of instances of acute pancreatitis. Dr. Wangensteen believed therefore that it was wise in most instances to do a delayed operation and to excise the gallbladder. The manner in which gallbladder disease predisposes to acute pancreatic necrosis is not well-understood. Experimental acute biliary infections do not give rise to acute pancreatitis. Certainly our universally practiced method of treating acute cholecystitis conservatively should eventuate in a number of cases of acute pancreatitis if acute biliary infections were a precursor of pancreatic necrosis. The safety

of treating acute biliary infections conservatively is well established. It was Dr. Wangensteen's impression that the cause of most instances of acute pancreatic necrosis was to be sought in a combination of factors which, when operating singly, were unable to produce the disease:

That the diagnosis of acute pancreatic necrosis can be made with some assurance without operation, Dr. Wangensteen felt to be well demonstrated in this small series in that every case was recognized, with the exception of the first. Dr. Wangensteen stated that only once had the diagnosis of acute pancreatic necrosis been made when the operative findings were negative. This patient complained of severe left sided pain, a sign to which Katsch of V. Bergmann's clinic has called attention as being of diagnostic import in acute pancreatitis. This patient later developed a frank pneumonia and Dr. Wangensteen felt that the abdominal pain was due to a diaphragmatic pleurisy. Dr. Wangensteen stated that none of the cases in his series complained of localized left sided abdominal pain. Dr. Wangensteen stated that he had no experience with the urinary diastase test of Wohlgemuth nor with the blood amylase test of Elman of St. Louis. He felt that these were not specific in that abdominal findings have been recorded in other conditions.

Dr. Wangensteen wished to stress the point that the usual symptomatology of acute pancreatic necrosis is more like that described here than that found in texts. The textbook description obtains usually only antemortum or in instances of "pancreatic apoplexy."

The operative mortality in dealing with acute pancreatic necrosis is more than 50 per cent, as shown by a number of statistical studies. Dr. Wangensteen felt if a patient might survive operation which accomplishes nothing specific for sixteen days that without operation the patient's chances were very much improved. There will naturally be deaths with conservative treatment, but Dr. Wangensteen felt that they would be less numerous. Practically all patients with "pancreatic apoplexy" in which large blood vessels are eroded die very quickly and dramatically with the typical picture of profound shock.

Starvation, Dr. Wangensteen felt, was to be an important item in the treatment because it inhibited in some degree the secretion of more tryptic ferment. Massive hot packs should be applied to the entire abdomen, and whatever narcotics are necessary to allay pain should be given. The vomiting of which these patients complain and the gaseous distention of the bowels are allayed by continuous nasal catheter suction siphonage, a measure that Dr. Wangensteen has found of great value in combating postoperative distention. The chief source of gas in the bowel is swallowed air, Dr. Wangensteen stated, and if the oral source is cut off, the distention will abate. Dr. Wangensteen said that he had treated four cases of simple mechanical bowel obstruction successfully without operation by this method. Enough fluid should be given by para-oral routes to insure a good urine output.

DISCUSSIONS (on pancreatitis)

DR. J. F. CORBETT stated that a condition which cannot be recognized clinically at all in many cases, and a condition that varies so much in its essential pathology, is going to add difficulties to the problem that confronts surgeons; but what he wanted to know was whether to operate or not to operate in these cases. He wished to compliment both the essayists and thought that a full discussion of the subject might aid materially in clearing up this subject.

In regard to Dr. Regnier's question in his case, Dr. Corbett felt that the answer would be determined by the kind of insurance; if this comes under compensation, he felt that the man would be entitled to collect; but if it comes under the ordinary accident policy, he felt the man could not collect because most accident policies say that the cause of death must be solely and alone due to the accident. He was of the opinion that in this case the policy is of fundamental importance.

DR. T. H. SWEETSER, as evidence in considering the advisability of delayed operations, called attention to three cases which had been under his father's care and with which he too was familiar. One patient, a victim of repeated gall stone colic, was brought to the hospital critically ill with signs of cholecystitis and acute pancreatitis. Operation was delayed for 14 days, after which the gallbladder was removed and the patient recovered. At operation the diagnosis was confirmed. The other two patients presented a complication which has not been emphasized this evening. The first of these came to them two months after the onset of acute pancreatitis. A pseudo-cyst of the pancreas was present when the patient arrived and at operation was found to contain 2,000 c.c. of fluid. In spite of drainage the pancreatic necrosis evidently spread gradually so that he died about two months later. At autopsy no remnant of living pancreatic tissue could be found. The second patient came complaining of abdominal distress and vomiting about four and a half months after a cholecystectomy for gall stones; it is reported that at that operation the surgeon had noticed patches of fat necrosis and enlargement of the pancreas. When she came to them a tumor could be demonstrated, which was proved to be a pseudo-cyst of the pancreas. The patient fully recovered following drainage of the pseudo-cyst.

DR. WILLARD WHITE was of the opinion that there are a number of things about this subject that are not understood, and he also believed that it was apparent that there are different factors that enter into the etiology in different cases. In Dr. Schwyzer's report there were 11 of his series that complicated disease of the tubes. It is difficult to explain the occurrence of pancreatitis with salpingitis; but most likely it would be either through the circulation or the lymphatic system.

Dr. White said that his own idea of why it is justifiable to operate on some of these cases of acute pancreatitis is based on his assumption that acute pancreatitis is due to the direct extension of disease in the bile passages and not necessarily by regurgitation of bile into the pancreatic duct. There are some fac-

tors which cause inflammation of the duct. The common duct of course passes through the head of the pancreas, and inflammation may extend into the pancreas by different extension and result in inflammation of the pancreas.

He cited one case of his own. The patient was a woman somewhere between 40 and 50 years of age, who entered the General Hospital with a picture of an acute and severe illness, with tenderness and pain located in the upper abdomen, and with a great deal of vomiting. He watched her for a while and was afraid not to operate. At operation he found a swelling of the pancreas. He drained the common duct, inserted forceps in the swollen area and she recovered.

He said he was greatly interested in hearing the other side of the question, that one should not operate on these cases.

DR. E. A. REGNIER said he was interested in Dr. Wangensteen's remarks and observation of this disease. He was of the opinion that the cases reported by Dr. Wangensteen were not all of fulminating type. He believed that a great many cases are of sub-acute type and that many of them would recover without operations. Cases of pancreatitis have been reported in children three or four years of age without any disease of the biliary tract but because of the high incidence of biliary disease associated with pancreatitis he had been led to assume that the two must be related. In the case Dr. Regnier reported he said he had diagnosed perforated ulcer first, and pancreatitis second, because of the absolute board-like rigidity of the abdomen, the absence of jaundice and the normal blood pressure. This patient appeared to be in shock, but his blood pressure was 124/72. Dr. Regnier did not believe that any surgeon would have dared refrain from doing a laparotomy on this patient. He felt that a fairly large per cent of these patients present symptoms that call for immediate operations. So far as treatment is concerned, Dr. Regnier did not see any good in incising the pancreas, but felt that the biliary tract should be drained when it was evident there was obstruction.

DR. E. C. ROBITSHEK said, in view of his limited experience in cases of acute pancreatitis, he hesitated to enter into the discussion. He had seen only two cases (both acute hemorrhagic in type) which he felt should be treated surgically. He followed the views of Sir Berkeley Moynihan, who divided the disease according to the classification suggested by Fitz, namely, of three types, the hemorrhagic, gangrenous and suppurative.

As to the symptoms, Dr. Robitshek desired to repeat, and emphasize, what had already been mentioned. First, pain. Pain, and not vomiting, shock, or cyanosis, is the first and most important symptom. According to Moynihan, "of all the pains the human body can suffer, this is by far the worst." Morphine gives little or no relief. Dr. Robitshek remembered distinctly the last case of acute pancreatitis he operated—a woman, who, in spite of a half grain of morphin sulphate, administered hypodermically at her home, shrieked with pain from the onset of the attack until placed under the

anesthetic on the operating table. Among other important phases of pain, in these cases, are such as the pain being very sudden, and violent in onset, not infrequently following a hearty, heavy meal, most severe in the epigastrum, and radiating to the back or loins.

Second, vomiting. This is almost constantly present, occurs early, is severe, recurs frequently, and resembles the vomiting of high bowel obstruction.

Third, shock. This must be understood to mean a rapid, weak pulse, cold face and extremities, shallow respiration, pallor and low blood pressure, and not merely prostration and anguish of pain. Here again Moynihan says, "Of the existence of shock in acute pancreatitis there is never the slightest doubt. No such state is seen in any other abdominal calamity."

Fourth, cyanosis or livid spots. Halsted was the first to call attention to this sign, as seen on the face, or in irregular patches on the abdomen (frequently about the umbilicus), on the limbs or about the loins. Such patches when present in an acute abdominal condition might be considered almost pathognomonic of pancreatitis.

Fifth, rigidity and tenderness. These are both present over the abdomen, but more especially over the epigastric region, yet not so marked as the board-like rigidity or marked abdominal tenderness seen in cases of perforated peptic ulcers.

Just a word about differential diagnosis; most of these cases Dr. Robitshek thought resembled, clinically, perforated peptic ulcers. It is well to remember, however, that acute pancreatitis occurs more frequently in females, whereas acute perforated peptic ulcers occur almost 100 to 1 times more frequently in males.

Dr. Robitshek said he had little or no faith in the Löwe test or in the Cammidge reaction, in cases of acute pancreatitis.

DR. J. M. HAYES said he had enjoyed this discussion very much and felt that he had learned something from it. He said his experience with this condition was much the same as that of Dr. Robitshek. He had not seen the type mentioned by Dr. Wangensteen. Perhaps it was because they had not been diagnosed as early as those Dr. Wangensteen reports. He had explored just two cases and they both were extreme cases. The only reason for exploring them was that the diagnosis might not have been correct. Both of these cases reminded him of the description of Sir Berkeley Moynihan's cases. He says, when one sees the *facies* of one of these patients once he never forgets it. The patient is in extreme agony. The pain is almost impossible to relieve.

The first patient had been seen by another doctor and a diagnosis of cholecystitis made. He gave the patient a hypodermic of morphin, and was not called back to see him for twenty-four or thirty-six hours. When the doctor returned the patient was in extreme pain. Three-quarters of a grain of morphin had little effect on the pain. The patient was taken to the hospital at once. "Board-like" rigidity was present over the abdomen. The patient gave the picture of shock. He was explored immediately, a brownish fluid escaped and extensive fat necrosis was present. The abdomen

was closed at once and the patient died a few hours later.

The second case was a patient brought in from the country. While climbing up on a load of hay he was suddenly seized with abdominal pain. He got down and went to the house and as soon as he reached the house he collapsed. When he reached the hospital, after a long ride through the country, his abdomen was "board-like" and he was in extreme shock. Again the only hope from an exploration was the possibility of an incorrect diagnosis.

He said he was very glad to listen to this report of these cases by Dr. Wangensteen. He had not observed this type of case, although he had seen such cases reported. He agreed with Dr. Wangensteen that very little could be expected from operation if one was absolutely sure of the diagnosis.

DR. CORBETT stated that he had had a few cases of pancreatitis. One of them he thought was gallbladder and he continued to think it was gallbladder as it went through much the same course that any gallbladder case does. Finally, an X-ray of the stomach showed a bit-out piece, and he then knew there was a cyst. He opened that case and apparently the whole pancreas came out. He brought the pseudo-cyst out and marsupialized it and that man recovered. The next case was a man who had rather indefinite symptoms and X-ray showed much the same picture, but unfortunately before the patient had got onto the operating table the cyst burst and was fatal. The next case was one of the most fulminating Dr. Corbett had ever seen. The woman seemed to have two distinct cycles of symptoms. The first was this semi-rigidity of the abdomen, perhaps a little more on one side than on the other, probably a 2+ rigidity. Then Dr. Corbett was in doubt as to the diagnosis. Pictures were taken for gas. These particular pictures were not clear and some more had to be taken. Very quickly the fulminating symptoms came on after that. Then the whole abdomen became rigid and board-like and had the appearance of a perforated ulcer. He operated and found a suppurated pancreatitis with peritonitis, and he lost that case also. The pancreas in that case seemed almost in the process of suppuration; it was a mass of suppurating tissue.

Dr. Corbett said it seemed to him that statistics were pretty doubtful unless one discriminates between cases, i.e., between the fulminating and the slow cases. When one sees a mild case he thinks he might wait, but when he sees a case go back on him, he may think that if he had hurried a little the patient might have been saved.

DR. H. O. MCPHEETERS said he would like to ask one question, and that was in regard to coronary thrombosis in the differential diagnosis of these cases. In the milder cases and not the fulminating type, may not the pain be confused with that of coronary thrombosis when the latter is not typical?

DR. ROBERT SCHWYZER thought that coronary sclerosis has to be considered in these cases. There is also another condition of the abdomen that must be considered in the differential diagnosis and that is throm-

bosis or embolism of the mesenteric vessels. In this, the pain may be about the same as in pancreatitis.

DR. WANGENSTEEN stated that he was not a proponent of the idea of operating on acute gallbladders. It is true, he said, that surgeons who have made a practice of operating for acute cholecystitis have occasionally seen scattered areas of fat necrosis at operation. Zoepf of the Barmbeck Krankenhaus reported seeing ten such instances among 150 cases of acute cholecystitis operated upon in the acute stage. Zoepf has described this condition as a "Vorstufe" or pre-stadium of acute pancreatic necrosis. Whereas there were no deaths in the ten cases seen by Zoepf or in another small group by Arnsberger, the mortality of acute pancreatic necrosis is more than fifty per cent. Dr. Wangensteen felt definitely that these were not the same disease. If this pancreatic edema with scattered fat necrosis observed occasionally at operation in acute cholecystitis were a forerunner of actual pancreatic necrosis, Dr. Wangensteen believed that many deaths from acute pancreatitis should be observed as a natural complication of our conservative treatment of acute cholecystitis. On the contrary, acute pancreatic necrosis is rarely observed as a complication of acute biliary disease, but chronic disease of the biliary tract in some manner predisposes to acute pancreatitis. Dr. Wangensteen related here that when he and his associates had established a common channel of common bile and pancreatic ducts by placing a ligature at the ampulla in cats, pancreatic necrosis did not result. When, however, this was done and a gastrostomy was made and a fatty meal of milk and cream and bile salts fed, pancreatitis resulted in a large number of instances. Excision of the gallbladder diminished the likelihood to the development of pancreatitis after a fatty meal. The feeding of alcohol, carbohydrates, or protein food through the gastrostomy tube in the presence of the common channel did not produce acute pancreatitis.

Even though the case records recited had impressed Dr. Regnier as being rather mild forms of the disease, Dr. Wangensteen submitted that, inasmuch as all the cases that he had operated upon acutely had died, he felt that this distinction was not well founded. Dr. Wangensteen believed that the picture he described was of more frequent occurrence than the textbook description of shock and cyanosis. Actual shock rarely attends acute abdominal disasters, Dr. Wangensteen stated, unless there had been considerable bleeding. Rupture of solid viscera such as the spleen or liver with ensuant hemorrhage is frequently followed by shock. Dr. Wangensteen stated that he had never seen shock soon after perforation of a hollow viscus, such as a perforated duodenal ulcer. True enough, the patient may be severely prostrated, but actual shock, as manifested by a rapid thready pulse or a depressed arterial blood pressure, is not present. Similarly, in acute pancreatic necrosis, Dr. Wangensteen felt that there would be true shock early only when "pancreatic apoplexy" is present. The prostration, however, may be marked. A number of ill-defined conditions are grouped together under the caption of shock, but clinicians should limit its use to a description of condi-

tions in which the pulse is hurried and a marked depression of the arterial blood pressure is present.

Dr. Wangensteen stated in answer to the inquiry that, should he encounter acute pancreatic necrosis at operation, he would close the abdomen, unless the common duct were dilated, in which event he would drain the gallbladder. He believed that a perforated ulcer could be differentiated from pancreatic necrosis in all instances by the aid of the fluoroscope. In only one instance in this group of cases, Dr. Wangensteen stated, was the rigidity great enough to suggest a perforated duodenal ulcer. No air was visualized beneath the diaphragm. Some years ago, Dr. Wangensteen stated that he had closed by suture the perforation of a duodenal ulcer for a student. A year ago, the patient presented himself again with signs of a perforation, but no gas was visualized beneath the diaphragm on fluoroscopy and on plates taken in the erect posture; and it was therefore felt that a tag of omentum had sealed the perforation and no further leakage was occurring. The patient did well on conservative observation.

The delayed operation should be done for acute pancreatitis, Dr. Wangensteen believed, for the majority had gallbladder disease. In young patients (under 20) perhaps the same indication for the performance of operation did not exist, as it would be less likely that coexistent biliary disease would be found. Recurrent acute pancreatic necrosis may also occur, and even after excision of the gallbladder, but less frequently than if the biliary tract disease remains uncorrected.

Wohlgemuth believed the best diet in acute pancreatitis to be an anti-diabetic regime with high fat and protein content. Dr. Wangensteen felt on the contrary that fat was to be avoided because of the relationship of pancreatitis to fatty meals as shown in the experiments referred to above. Camus and Gley maintained that they had produced active trypsin in the pancreas by electrical vagus stimulation. As a corollary of this, Dr. Wangensteen felt that it might be advantageous to give atropin in the attempt to inhibit pancreatic secretion.

DR. CORBETT said he had enjoyed this program very much and he wanted to thank the men for the pleasure it had given him and he was sure the other members were of the same opinion.

DR. T. H. SWEETSER reported the following "Unusual Case of Adenomatous Prostate."

This case is reported to call your attention to the pathological and surgical importance of a small group of "accessory" gland tubules at the bladder outlet, the subcervical glands of Albarran. This group is barely mentioned in texts on urology and in some anatomies, but has been discussed occasionally in the periodicals and recently in a monograph on the surgical pathology of prostatic obstruction.

The patient, a man 77 years old, was brought to the hospital in critical condition during the subsidence of a protracted severe urinary hemorrhage. His urine was extremely foul due to the fact that he had catheterized himself for the past eight years without any attempt

at aseptic technic. An inlying urethral catheter was not well tolerated. Therefore a prevesical incision was made down to the bladder wall, the wound was packed open, and on the third day the bladder was opened. Both stages were done under local infiltration anesthesia with as little insult as possible, but his blood



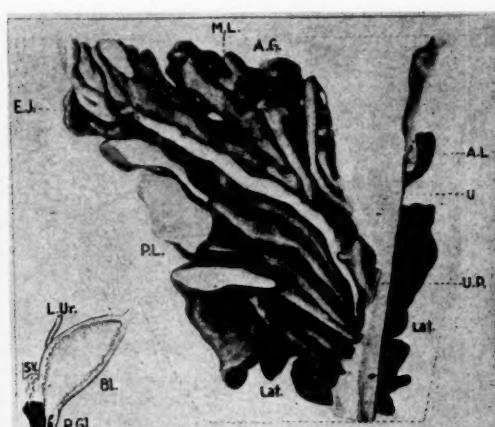
Fig. 1. Sagittal section through bladder, prostate, and pedunculated tumor. A, pedunculated tumor from Albaran's glands; B, bladder wall, mucosa greatly thickened; C, middle lobe of prostate; D, lateral lobe of prostate.

pressure dropped and continued low. He died ten days after admission from circulatory failure and terminal bronchopneumonia.

Autopsy showed a remarkable condition. True, there was found a moderate enlargement of both lateral lobes of the prostate and also of the middle lobe or commissural portion. But in addition there was a large soft hemorrhagic solid round mass almost filling the bladder and attached by a pedicle to the floor of the prostatic urethra proximal to the verumontanum. This mass was evidently an adenomatous enlargement originating in Albaran's group of subcervical gland tubules. The bladder wall was very thick, due quite largely to hyperemia and inflammatory edema of the mucosa. The pedunculated mass was the evident source of the hemorrhage and toxemia, as well as the principal cause of the urinary obstruction, forming a fairly perfect ball valve.

The illustration, a sagittal section, shows well the characteristics of enlargements originating in the middle lobe or commissural tubules of the prostate, and the characteristics of enlargements originating in Albaran's group of subcervical gland tubules.

According to Lowsley's description,¹ the prostate



Sagittal view of a wax model of the prostate of a new-born infant. M.L., middle lobe of internal lobes; P.L., posterior lobe; E.J., ejaculatory duct; A.G., subcervical glands of Albaran; A.L., anterior lobe; U., urethra; U.P., urethra prostatica; A.G., subcervical glands of Albaran; M.L., middle lobe tubules; L.U., left ureter; BL., bladder; P.G., prostate gland.

Fig. 2. Reduction from illustration in article by Lowsley,¹ Journal of Anatomy, 1912.

itself develops from five groups of tubules, anterior, posterior, middle, and two lateral, which in early embryonic life are separate, but which later coalesce to form a single organ. Separately, in the submucosa of the prostatic urethra, just at and distal to the bladder outlet, a group of tubules appear about the sixteenth week of fetal life, the so-called Albaran's subcervical glands. They are separate from the prostate, of somewhat different structure microscopically, and may enlarge independently without prostatic hypertrophy.

Alexander Randall has well described the differences in the effect of enlargement of these various structures.^{2, 3} The middle lobe of the prostate, being situated underneath the trigone muscles, pushes upward under them and projects into the bladder as a sessile rounded mass in the midline. Albaran's glands, being situated in the submucosa overlying the muscle bundles that extend from the trigone into the prostatic urethra, enlarge directly out into the urethra and thence upward into the bladder. Being restrained by no overlying muscle, such an enlargement is globular and soon becomes pedunculated and lies within the bladder attached by a pedicle to the floor of the urethra.

Diagnosis may be made by cystoscopy, but a marked enlargement originating in Albaran's glands may be confusing if one does not keep that entity in mind.

Surgically, it is readily seen that, while the enlarged prostatic middle lobe may be removed in one mass with the enlarged lateral lobes either suprapubically or through the perineum, the removal of a greatly enlarged

pedunculated subcervical gland mass is quite a different matter. Such a mass may easily be removed through a suprapubic opening by division of its pedicle; enucleation of any prostatic enlargement that may be found would then be an independent step in the operation. During a perineal prostatectomy, on the other hand, an enlargement of Albaran's glands may easily be missed entirely, especially if large and pedunculated as in this case; the operation will then fail to give relief. With the enlargement of such a size as seen here it would seem to me that, even though recognized pre-operatively, satisfactory removal perineally would be impossible; only a suprapubic approach would be adequate.

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3. Randall, Alexander: Surgical Pathology of Prostatic Obstruction. Williams & Wilkins Co., Baltimore, 1931.

DISCUSSION

DR. O. H. WANGENSTEEN asked Dr. Sweetser if it is not true that Zuckerkandl and Tardler, in their monograph on hypertrophy of the prostate, state that prostatic hypertrophy of the prostate itself is due to the growth of the paraurethral glands into it.

The meeting adjourned.

H. O. McPHEETERS, M.D.,
Secretary.

INJECTABLE OVARIAN PREPARATIONS
OMITTED FROM N. N. R.

In 1930, the Council on Pharmacy and Chemistry omitted all desiccated ovarian preparations for oral administration, provisionally retaining those intended for intramuscular or hypodermic administration. The manufacturers of these products were informed that these would be omitted at the close of 1931, unless meanwhile acceptable methods of assay for hormone content were adopted and acceptable evidence for their effectiveness submitted. The interested firms have not submitted such evidence. As to the adoption of an assay method, it was later decided, on the basis of opinions expressed by the Council's consultants that our present knowledge make it undesirable to adopt assay methods for the determination of the hormone content of these water-soluble preparations. Since no acceptable evidence exists for the usefulness of such preparations, the Council voted to omit Ovarian Substance Soluble Extract—P. D. & Co.; Corpora Lutea Soluble Extract—P. D. & Co.; Corpus Luteum Extract—Lederle, Corpora Lutea Soluble Extract—Wilson, and Sterile Solution of Lutein—H. W. & D. (Jour. A. M. A., January 30, 1932, p. 402.)

MINNESOTA MEDICINE

PROGRESS

Abstracts to be submitted to Section Supervisors.

Members are urged to abstract valuable articles which they run across in their reading and send the abstracts to the physicians in charge of the respective sections. In order to avoid duplication it would be well to communicate with one of the section supervisors before the article is abstracted.

SECTION SUPERVISORS

EYE, EAR, NOSE AND THROAT

Virgil J. Schwartz, M.D. 617 Medical Arts Bldg. Minneapolis, Minnesota	Merritt Wheeler, M.D. 1027 Lowry Med. Arts Bldg. Saint Paul, Minnesota
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MEDICINE

Richard Bardon, M.D. 205 West Second Street Duluth, Minnesota	Thomas A. Peppard, M.D. Medical Arts Bldg. Minneapolis, Minnesota
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PEDIATRICS

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ROENTGENOLOGY

Leo G. Rigler, M.D. University Hospital Minneapolis, Minnesota	J. D. Camp, M.D. Mayo Clinic Rochester, Minnesota
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SURGERY

A. E. Schomer, M.D. Mankato Clinic Mankato, Minnesota	O. J. Campbell, M.D. Medical Arts Bldg. Minneapolis, Minnesota
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EYE, EAR, NOSE AND THROAT

EXTRACTS FROM THE PROCEEDINGS OF
THE SIXTH CONGRESS OF OTO-LARYNGOLOGY
OF THE COUNTRIES OF THE NORTH.
(Acta Oto-Laryngologica, Vol. XVI.)

Frithiof Leegaard (Oslo), *The Treatment of Inflammation in the Nasal Sinuses.*

The author and a large number of those who discuss his paper, voice their experiences particularly in regard to: (1) radical sinus surgery with complete removal of the membrane or partial removal, (2) the problem of adequate treatment in chronic frontal sinus infections.

Leegaard reports excellent results in chronic maxillary infection with a compromise between the radical method

of the Caldwell-Luc operation and the making of an ordinary sinus window. He makes an unusually large opening in the inferior meatus, and then removes the tip of the overlying inferior turbinate. He believes that the removal of the anterior tip is an important factor in his successes. This procedure suffices for the majority of causes and only rarely does the author resort to the Caldwell-Luc operation.

The consensus of opinion seems to be that as good if not better results are obtained by removal of only diseased antrum lining as are obtained by a complete curetting or stripping out of the membrane.

Frontal sinus surgery after the method of Barany has several enthusiastic supporters. The author offers twenty-nine case reports. The method includes removal of the floor through an orbital approach. A large opening is made into the nose, the frontal process of the maxilla is removed completely to the pyriform aperture and also a portion of the nasal bone. A flap of nasal mucous membrane is then taken from the lateral nasal wall or the septum and swung up to line the passageway from the sinus to the nose. Paraffin gauze is used to tampon the passageway for the next 5 or 6 days. The sinus is then flushed once daily with sterile salt solution until healed. Only the diseased portion of the sinus membrane is, as a rule, removed.

F. Soderberg (Upsala) *About the Results of Barany's External Operation of the Frontal Sinuses.*

The Barany method of frontal sinus operation has been used in the Otological Clinic in Upsala for seven years. For this report the cases were re-examined to determine the end results. Forty-one cases constitute the group. Thirty-seven showed an adequate open communication between the sinus and nasal fossa. In thirty-one of these cases the sinus membrane was left. Two of the cases died following operation.

S. Mygind (Copenhagen) *Treatment of Otogenic Sepsis and Sinus Thrombosis.* (Report from the Copenhagen Commune Hospital.)

In a period of eight years (1915-1922), 1000 mastoidectomies were performed. In this series there were ninety-eight cases of sinus thrombosis. The treatment of this complication consisted of jugular ligation and removal of thrombi. The mortality of cases so treated was 45 per cent.

In the eight years (1923-1930) following the completion of this first series, about 2,000 mastoidectomies were performed. The incidence of sinus thrombosis in this group amounted to 101. In treating this complication in this series, a conservative plan was followed. In only eight of the cases was jugular ligation thrombectomy done (six of the eight cases succumbed). The mortality was only 29 per cent.

Discussing these results, the author emphasizes the fact that series of statistics are difficult to compare properly. In institutions, cases are often admitted late; the type of infection prevalent, the incidence of brain abscess, and the proportion of acute to chronic infections all play a part in influencing the mortality rate. He believes, however, that in spite of the probability

that they were better able to treat their cases in the second series because of added experience, and also the indication that the second series may have included less severe infections, conservative treatment results in a higher percentage of cures. The incidence of complication in the first series was ninety-eight cases of sinus thrombosis and twenty-seven of brain abscess to 1,000 mastoidectomies, while in the second series there were 101 cases of sinus thrombosis and 26 cases of brain abscess to 2,000 mastoidectomies.

Mygind concludes that any operation on the sinus or the jugular vein carries with it, because of the trauma, a certain added factor of risk. This is the result of: (1) the necessity of a new clot forming which probably becomes infected, (2) an interruption of the circulation which must be of consequence to the brain, meninges, and the power of resistance of the venous walls, and (3) the direct trauma of operation on the sinus, accompanied by the plugging.

LAWRENCE R. BOIES, M.D.

GYNECOLOGY AND OBSTETRICS

THE DIAGNOSIS OF PREGNANCY BY THE BROUHA-HINGLAIS-SIMONNET REACTION: L. Brouha and H. Hinglais. (*Gynecologie et Obstetrique*, Tome XXIV, No. 1). This test is based upon the fact that the urine of pregnant women contains a specific hormone, and when samples of this urine are injected into immature male mice, puberty is brought about within a few days. This is determined by a rapid increase in the weight of the animal and especially by an increase in the size of the seminal vesicles.

Puberty in these animals normally occurs during the fifth or sixth week and is characterized by a definite increase in weight. For the test one should use mice of a known age, or weighing less than 10 grams. Samples of urine from 142 normal non-pregnant women were injected into 310 mice. In no instance was there any evidence of the specific hormonal reaction as shown by the characteristic changes. Samples of urine from thirty-seven non-pregnant women who were being treated in the clinic were injected, with no reaction which would suggest the presence of a specific hormone. Samples of urine from seventy-two pregnant women were injected into 291 mice. All of these showed characteristic reactions, namely an increase in the size of the seminal vesicle amounting to ten times that of the controls.

The urine is treated with ether and filtered as in the Zondek test. Increasing the dose does not hasten the reaction. Three injections of 0.3 c.c. a day for four days. Changes begin to appear in forty-eight hours and are characteristic by eight to ten days.

Up to date, tests from the urine of 400 pregnant women gave uniformly positive results, except in one instance through technical error. In the absence of pregnancy the test was always negative. Positive tests

have been obtained as early as 8 days after the first missed menstrual period. The test remains positive for a few days following labor. In cases of death of the fetus, whether uterine or ectopic, the hormone continues to be present in the urine till the placenta is expelled or destroyed. In cases of hydatid mole, the test is positive and remains so as long as the mole is active.

The authors conclude that, in the hands of experienced workers who are familiar with the reactions in male mice, the test is sufficiently definite to be of great practical value.

A. L. McDONALD.

THE INFLUENCE OF A SALT-FREE DIET UPON LABOR: Hofstein and Petrequin (Strasbourg) (*Gynecologie et Obstetrique*, Tome XXIV, No. 2). The authors noted that certain women, who had been placed upon a salt-free diet for therapeutic reasons, were able to deliver themselves rapidly and comparatively painlessly. In the case of two primiparas the total period of labor was three and one-half and four and one-half hours, and for two multiparas the time was two and one-half and three and one-half hours.

A study of the literature failed to furnish any explanation. Studies of the chloride content of the blood in some twenty women during labor, in order to determine any possible relationship between the chloride content and duration of labor, gave inconclusive results.

A group of seven women were placed upon a rigid salt-free diet for from two to six weeks preceding labor. In the case of five primiparas, the period of dilation was from two and one-half to five hours; with two multiparas, the period was one and six hours. The authors offer no explanation but consider the findings suggestive.

A. L. McDONALD.

THE USE OF AN ANTERIOR PITUITARY LUTEINIZING SUBSTANCE IN THE TREATMENT OF FUNCTIONAL UTERINE BLEEDING: Emil Novak and G. B. Hurd (*Am. Jour. Ob. and Gyn.*, Vol. XXII, No. 4). Functional uterine hemorrhage in young women frequently recurs following curettage. Radiation therapy is too uncertain in these individuals. Repeated curettage may tide over till an equilibrium is reached. The pathological findings in ovary and endometrium are somewhat characteristic.

The ovary shows persistence of an unruptured graafian follicle and absence of corpus luteum. The ovarian disturbance consists of a persistence and excess of follicle stimulus, with an absence of the progestin influence, corpus luteum. This is confirmed by findings in the endometrium where there is no evidence of changes usually produced by the progestin furnished by corpus luteum. The prolonged influence of the follicle hormone without the inhibitory effect of progestin causes menorrhagia. The condition in the endometrium is not a true hyperplasia, but represents a persistence and exaggeration of the interval stage. The authors

consider that these disturbances are due to abnormalities in the pituitary anterior lobe secretion.

Investigators agree that the anterior lobe produces two hormones: "Prolan. A" concerned with follicle growth and ripening; "Prolan. B" concerned with luteinization in the ovarian follicle. The pituitary secretion is increased during pregnancy and large amounts are found in the urine. Zondek has isolated both hormones in watery extract from the urine. The dominating influence of the secretion as isolated from the urine during pregnancy is to stimulate luteinization, increase the size of the uterus and ovary. The characteristic finding in these cases of bleeding is absence or deficiency of luteinization. Theoretically, the administration of corpus luteum extract should re-establish a balance. This has not been possible in practice.

A substance containing Prolan. B should convert the granulosa cells of the ovary to lutein cells and supply sufficient progestin to maintain a proper balance. The authors have been working with a substance obtained from the urine of pregnant women, a concentrate precipitate, with inert matter removed. While varying in strength they found that in experimental animals the extract produced luteinization. Theoretically, if this could be accomplished in the patient, the ovaries would produce their own progestin, and effect an equilibrium. The material used has been freed of the follicle hormone, Prolan. A, is non-irritating and non-toxic.

The dosage was arbitrarily established at 200 rat-units by intramuscular injection, daily. They hope to secure luteinization of the granulosa cells of the ovary, and thereby transform the "Stationary Hyperplastic" condition of the endometrium to the pre-gravid form, thus re-establishing a balance. The results were often too rapid for this explanation and seemed to be due to direct effect upon the unknown bleeding factor.

In all but seven of fifty-one cases the results were prompt and striking.

A. L. McDONALD, M.D.

MEDICINE

TUBERCULOSIS ABSTRACTS*

Sanocrysin (sodium-gold-thiosulphate) was announced by Mollgaard in 1924. Clinical observations of the effect of the drug, published by numerous European writers since then, have been decidedly variable. Generally speaking, favorable results have been reported of cases with the exudative type of lesion, while little clinical improvement has been noticed in cases of the chronic type. Since some of the clinical reports do not seem to justify the conclusions drawn, a group of investigators in the William H. Maybury Sanatorium in Michigan decided to make an intensive study of the effect of sanocrysin on a small, carefully selected, closely comparable group according

*From *Tuberculosis Abstracts*, a review for physicians issued monthly by the National Tuberculosis Association, Vol. V, Number 1, January, 1932.

to a prearranged plan. Results of the study were published in the October, 1931, American Review of Tuberculosis, of which the following is a brief abstract.

A TRIAL OF SANOCRYSIN

Mollgaard claimed that sanocrysin has a specifically curative effect on tuberculosis. He believed that the drug, introduced into the blood stream, permeates tuberculous lesions and there kills many, if not all, of the tubercle bacilli. Exudative, not too acute, pulmonary lesions of early age, being more pervious than the fibrous type, were considered more responsive to treatment. The fever, albuminuria, eruptions, and loss of weight resulting from the treatment were attributed to the liberation of toxins from the disintegrated bacilli. To offset the ill effects, an anti-serum was developed, and this was administered at the first sign of reaction; namely, albuminuria.

Other workers used the drug, as well as various other gold compounds, in human cases. The amount of gold in these compounds varies greatly; sanocrysin contains 37.4 per cent of gold. The present consensus of opinion seems to be that the chemical is not a specific bactericide, that nevertheless favorable responses sometimes occur, and that the toxic properties of the drug compel consideration. Metallic poisoning, rather than tuberculin-like shock, seems to account for the unfavorable reactions; consequently, Mollgaard's anti-serum has been discarded by most clinicians and smaller doses of sanocrysin are given.

PLAN OF TRIAL

The treatment was explained to a group of patients of the William H. Maybury Sanatorium. The 24 patients who were finally chosen from among the volunteers were all in good general condition, who would, therefore, not be likely to suffer ill effects from the drug. Most of them had benefited to some extent by the routine sanatorium treatment, but the healing of their disease was slow and incomplete. The lesions were chiefly of the exudative and mixed exudative-productive types. All were free from complications.

On the basis of clinical, X-ray and laboratory findings, the patients were then divided into two equal and comparable groups, cases being matched one with another as closely as possible. By a flip of the coin, Group I was designated as the sanocrysin-treated and Group II as controls. The patients themselves were not aware of any distinction in treatment.

METHOD OF OBSERVATIONS

The patients were put to bed for a month prior to starting any medication, during which time uniform data and information were collected to serve as a basis of comparison. The preliminary thirty days' study was carried out in the following manner:

1. The chest was examined biweekly, particularly to determine any variation in the extent or distribution of the râles, the findings being described in the record.
2. The chest was X-rayed (stereoscopic) at the beginning and at the end of the month and the films

preserved, special notes of any changes being recorded.

3. Careful records of the presence and clinical course of complications and symptoms were made.

4. The sputum was weighed daily, and this figure was charted; also averaged at the end of the month.

5. The sputum was examined microscopically every two weeks to determine the presence of tubercle bacilli. A method of sputum concentration and animal inoculation was used routinely when indicated.

6. Body weight was measured and recorded weekly.

At the end of this preliminary checking, the same routine was continued during the period of the trial, except that physical examinations were done more frequently, particularly to show the presence and behavior of perifocal reactions, and stereograms of the chest were made monthly; oftener in cases showing rapid change.

Each patient receiving sanocrysin (Group I) was started with 0.1 mg. of the drug, dissolved in 2 c.c. of distilled water and injected into a cubital vein. At intervals of four days, unless contraindicated, additional injections were given, increasing by 0.1 gm. up to 0.3 gm., and then increasing to 0.5 gm. The amount of distilled water was increased to 5 c.c. when the dose of sanocrysin exceeded 0.3 gm. The 0.5-gm. dose was then repeated until the course was completed. The number of injections varied from nine to fourteen, and whenever there was a suspicion of a dangerous reaction the next dose was reduced, omitted or postponed. The total amount of sanocrysin administered to single patients varied from 3.1 to 6.1 gm., while the total amount per kgm. of body weight varied from 0.6 to 0.1 gm. The patients treated as controls (Group II) each received 14 intravenous injections of distilled water (2 c.c. each) at intervals of four days.

EFFECTS OF TREATMENT

The detailed effects on the tuberculous conditions are minutely described in the article. The observations include the effect on temperature, pulse, lassitude, body weight, cough, sputum, appetite, sleep, physical findings, pain in chest, hemoptysis, dyspnea. Similarly, the toxic effects referable to the drug are noted as these affected the skin, nerves (neuritis), mucous membrane, eye, gastrointestinal tract, liver, kidney, etc. Laboratory evidences were as carefully and as fully studied. The study lasted approximately six months, during the first two of which sanocrysin treatment was given. During the entire period of the trial, both groups were kept in bed.

A follow-up of patients was instituted one year after the close of the study. In finally determining the effects of the treatment, all the observations were correlated. Chief reliance was placed on such factors as changes in the X-ray shadows of pulmonary lesions, presence or absence of tubercle bacilli in the sputum, measurable symptoms such as temperature, and fluctuations in body weight. Changes in physical signs were not given much value. Toxic effects of the drug were distinguished as far as possible from symptoms referable to the disease itself. A summary of the results is as follows:

	Group I (Sanocrysin)	Group II (Control)
Number	12	12
Slightly improved	5	6
Much improved	1	1
Unchanged	0	3
Slightly worse	1	1
Much worse	4	
Slight toxic effect	8	
Severe toxic effect	3	
Fatal	1	

CONCLUSIONS

"1. This investigation proves the need and the merit of a carefully prearranged plan to be followed in a clinical test of a chemotherapeutic agent in tuberculous patients.

"2. We discovered no evidence in 12 cases, studied according to such a plan, that sanocrysin, given in small, gradually increasing doses up to a total of 6.1 gm., has a beneficial effect on pulmonary tuberculosis or its complications.

"3. Compared with 'control' cases, more of our sanocrysin-treated cases became worse. The evidence is strongly suggestive that sanocrysin was at least partly responsible for the unfavorable trend of the disease in some of these cases.

"4. Sanocrysin exerted definitely harmful systemic effects in all our treated cases, partly as a secondary result of its action on the local tuberculous lesions, but mostly, we believe, by virtue of its own inherent toxicity. These effects were usually on the nutrition, gastrointestinal function, temperature, skin, mucous membranes and kidneys.

"5. One sanocrysin-treated patient died from parenchymatous degeneration of the liver and other effects which we interpret as gold poisoning. We could not anticipate this unfortunate outcome.

"6. Because of the lack of definite evidence of benefit and because of positive evidence of harm which in some respects is long-lasting, especially in the kidneys, the use of sanocrysin, as we used it, is not justified."—*Sanocrysin in Pulm. Tuberc.*, J. Burns Amerson, Jr., B. T. McMahon, and Max Pinner, *Am. Rev. of Tuberc.*, Oct., 1931.

PEDIATRICS

TREATMENT OF ANEMIA OF INFANCY WITH IRON AND COPPER: H. Joseph (Bull. Johns Hop. Hosp., XLIX, 246, No. 4, October, 1931). In this paper Josephs reports a study of the treatment of so-called "secondary anemia" of infancy with iron and copper. The investigation was conducted on a group of infants ranging between three months and two years of age. The iron was administered in the form of a 10 per cent solution of ferric ammonium citrate, giving 2 c.c. per kilogram of body weight per day. The copper was administered in the form of a 0.5 per cent solution of copper sulphate, giving 1 c.c. per kilogram of body weight daily. From these studies

Josephs found that copper accelerated the rise in hemoglobin when given in addition to iron. This acceleration was most evident when the hemoglobin was above 50 per cent, for above this point the hemoglobin curves from cases on iron alone tended somewhat to flatten out, whereas those from cases on iron and copper continued to rise steeply up to about 70 per cent. In this series it made no difference in the speed of recovery whether the child was on a diet of milk alone, or whether vegetables or eggs were included, and medicinal iron was found to be superior to food iron in causing a rapid recovery. The effect of the iron is first on the reticulocytes, then on the hemoglobin, and there usually exists a latent period before the effect on the hemoglobin is manifested by a rise. The end of the latent period appears to coincide with a sufficient rise in reticulocytes. Copper appears to accelerate hemoglobin formation, and has no effect on the reticulocytes.

C. A. STEWART.

DIE KLINISCHE BEDEUTUNG DER CRANIOTABES: I. Jundell (Acta Paediatr., XII:1:1-40, September, 1931). In order to determine whether or not craniotabes was of clinical significance in the diagnosis of rickets, the author tested out the value of antirachitic treatment in a group of 129 infants. In all cases, the mothers were given either cod liver oil or vigantol before delivery, and the infants were similarly treated after birth. A control group of seventy-nine infants was kept on the same regimen of feeding and supervision, but given no anti-rachitic treatment. Monthly observations were made in most cases. In a few infants of each group a supra-occipital craniotabes was detected during the first month; the incidence gradually increased until the fifth month, when 65 per cent of the treated group and 58 per cent of the controls showed this type of craniotabes. After the fifth month, there was continuous evidence of healing until the 13th month, when no craniotabes was found in either group. A softening of the parietal bones occurred in 31 per cent of the treated cases and in 25 per cent of those untreated; this softening was noted in the largest number of cases in both groups during the third month and disappeared in both after the sixth month. There was no effect of antirachitic treatment apparent in either of these types of craniotabes.

During the 15 months period over which these infants were observed, clinical signs of rickets (*i.e.*, rosary or enlarged epiphyses) were definitely noted in two of the treated cases and 18 of the controls. On every visit after the fourth month, X-ray plates were made of the right hand, whenever possible. One infant out of 110 of the treated group showed evidence of mild rickets, which had entirely healed one month later; ten of the fifty-nine control infants were found to have signs of mild or severe rickets. The author therefore concludes that specific treatment which prevents rickets has no effect on craniotabes, and that the latter should not be looked upon as a clinical mani-

festation of the disease. He believes rather that craniotubes is a physiological or simple hypoplastic phenomenon and suggests that it might be produced by the pressure of the growing brain against the bones of the head while the child is in a horizontal position—a condition which would not obtain in primitive tribes where the infant is carried in a vertical position for the greater part of the day.

LOUISE G. FRARY, M.D.

VACCINE TREATMENT OF ASTHMA IN CHILDHOOD: A. Graeme Mitchell, M.D., and Merlin L. Cooper, M.D., Cincinnati (Arch. Ped., December, 1931, Vol. XLVIII, No. 12). Practically it appears that the asthmatic patient is hypersensitive, or, to employ more acceptable terminology, allergic, to certain substances which in most instances are obviously protein in nature. Whether the allergic state is inherited or whether it is acquired, removal of contact or desensitization of the patient may be curative so far as the attacks are concerned. It is this fact which is taken advantage of in treatment.

A certain number of cases of asthma are associated with upper respiratory tract infection. That is to say, the paroxysmal attacks follow acute nasopharyngitis.

In the authors' work with asthma as it relates to upper respiratory tract infections, they carefully cultured the material obtained by swabs from the patient's nose and throat, preferably during an attack of acute upper respiratory tract infection, testing the skin sensitivity to the various microorganisms obtained; preparing and injecting mixed vaccine made from the individual vaccines of the microorganisms to which the patient was skin-sensitive by intracutaneous test. In treatment, one-half to one minim was injected subcutaneously, and, depending upon the degree of local reaction, which should not be too severe or last more than twenty-four hours, this dose was repeated or increased daily until a maximum of eight minims was reached, upon which this amount was given two or three times a week for several weeks longer.

Some authors have obtained equally good results in asthma with stock as well as with autogenous vaccines, and it has been reported that injections of tuberculin cause the arrest of asthmatic attacks.

A certain number of children, whose asthmatic attacks are associated with upper respiratory tract infections, are decidedly benefited by vaccines and in some instances attacks, which have previously been frequent and severe, cease for months or years after such treatment. Vaccines may be helpful when other methods have failed.

It is not clear whether the vaccine treatment acts by specific desensitization to microorganisms which the patient harbors in his nose and throat and which may be causative of the asthmatic attacks, or whether the mechanism is simply one of non-specific protein therapy.

Every child suffering from asthma, especially when the attacks are associated with upper respiratory tract infection, should be given the benefit of a trial with

treatment by a properly prepared and administered vaccine when other measures of treatment fail.

R. N. ANDREWS, M.D.

IMPETIGO CONTAGIOSA NEONATORUM: Irwin Rubell, M.D., Chicago (Arch. Ped., Dec., 1931, Vol. XLVIII, No. 12). The lesions observed in our series grouped themselves into three types: The bullous, the pustular and a third group for which the term seaceous would seem appropriate. All three types of lesions frequently occurred simultaneously in the same patient.

Labhardt and Wallart, in their cases of congenital impetigo, obtained the staphylococcus, and occasionally the streptococcus or diplococcus.

The course in most cases was benign and the outcome favorable. However, complications may occur and be very severe or even fatal. One patient, suffering from an extensive pemphigoid eruption with much exfoliation, developed bronchopneumonia to which he succumbed.

Prophylaxis: All babies received a daily sponge with 1:5000 bichloride of mercury which was rinsed off with clear water within two minutes. The scales were washed daily with a 1:1000 bichloride. In order to avoid excessive handling and possible contamination of babies' clothes, the following technic was carried out: Upon delivery from the laundry, the various articles of infants' wear were sorted into separate bundles, labelled and sent through the operating room sterilizers. The nurses would then use sterile forceps to remove the articles needed. No one was permitted into the nursery except the nurses actually on duty there. Attending physicians had to wear gowns and gloves when examining infants.

A baby once removed from the well nursery was never returned there. A mother suffering from an infection of any kind was transferred to another floor, and the baby removed to the children's ward. Visitors to the mothers were limited to two a day and were excluded from the room when the baby was brought in for nursing. Overcrowding of the nursery was an important factor in spreading the infection.

Treatment: In response to a questionnaire, the Society of the Lying-In-Hospital of New York states that exposures to the alpine sun-lamp gave the most satisfactory results. In the author's cases, the lesions were opened as soon as discovered, touched up with 95 per cent alcohol, followed by the application of two per cent ammoniated mercury ointment.

R. N. ANDREWS, M.D.

ROENTGENOLOGY

INDICATIONS FOR VARIOUS RADIOLOGICAL PROCEDURES IN THE EXAMINATION OF THE LUNGS: RADIOSCOPY, TELERADIOGRAPHY, STEREORADIOGRAPHY. Dioclès and Azoulay (Revue de la tuberculose, 1931, XII, 957).

According to these members of the staff of the Hotel Dieu in Paris, Radioscopy is a useful procedure and may even be substituted for radiography in certain cases, as in the examination of patients with advanced lesions in dispensaries, where on account of the expense and labor involved it would be impracticable to make a film in every case. It has the advantage of permitting changes in the position of the patient and of showing the movements of the heart, lungs and diaphragm. They recommend that skiascopy be always used before a film is taken in order that the best position for taking it may be determined. Radioscopy alone should not be relied upon if negative when the history of the case suggests the presence of lesions too fine to be detected by it.

Teleradiography must *always* be used in taking chest films according to these writers. Their technic is as follows: A fine focus tube is used (3 millimeter or less), a distance of 1.5 to 2 metres, an exposure of a tenth of a second or less, a high kilovoltage (120 to 150 kilovolts) and an amperage of 100 to 150 milliamperes. In certain cases as in pleuro-pulmonary sclerosis or very extensive infiltration, the "rotating antidiaphragm" (Stephani), which seems to be a kind of very rapidly moving Bucky diaphragm, may be used in addition, but this is rarely necessary.

Stereoradiography permits better localization of lesions and determination of relations than the use of flat films. The writers recommend it when oblique films are taken as well as when antero-posterior or postero-anterior films are used. The posterior left oblique position gives good pictures of the posterior mediastinum, the bifurcation of the trachea and of the mediastinal gland area. The posterior border of the left heart is thus clearly defined. This is the position of choice in the study of adenopathy and of tumors of the mediastinum. The anterior right oblique position gives excellent views of the mediastinum, of the aorta, and of its crossing over the trachea and of its bifurcation. Lipiodol injections with stereo-radiography may help to determine the significance of puzzling shadows, for instance one at the right base, above the diaphragm, which may be due to bronchiectasis, to pleural thickening, to an abscess of the lung, to interlobar, mediastinal, or diaphragmatic pleurisy, to pyothorax, to abscess of the liver, cancer or suppurating hydatid cyst.

A. T. LAIRD, M.D.

SURGERY

PLANTAR TENDERNESS AS AN EARLY SYMPTOM OF THROMBO-PHLEBITIS. Dr. Gerhardt Tschmarke, Leipzig (Der Chirurg, Volume No. 3, Number 21, November 1, 1931, Page 924). Payr is the first to call attention to a tenderness, experienced by the patient on pressure of the sole of the foot, as an early sign of thrombo-phlebitis in the veins of the lower extremities. Observation at his Clinic since then has corroborated this sign as worthy of observation.

For example, in sixteen cases of primary thrombo-phlebitis in the veins of the foot and calf, five times this plantar sensitiveness was the only symptom to call attention to the condition, whereas eleven times it was associated with other subjective and objective signs. Cases of thrombo-phlebitis, which otherwise would escape attention, can in this way be discovered, and proper measures taken to prevent complications, such as embolus.

The statistics show that over a period of years, in thrombo-phlebitis was recorded as occurring in 1 to 2 per cent of the cases, but with this sign as an index, further observation showed evidence of thrombo-phlebitis in as many as 16 per cent of the cases. These latter cases were not recorded as thrombo-phlebitis unless, aside from the objective plantar tenderness, there were also, later, other objective signs, such as edema and measurable swelling. It was the author's experience that either immediately or within the next twenty-four hours after the development of this tenderness, other signs would show, such as edema and swelling, infiltration of the calf of the leg, and muscular resistance against passive dorsal flexion of the foot.

In the absence of any objective signs of thrombo-phlebitis, one is apt to overlook or minimize the patient's complaint of paresthesia in the foot, or a sense of tension in the calf of the leg. If, however, the tenderness in the sole of the foot is present, one can look for further trouble in the development of thrombo-phlebitis within the next twenty-four hours. For that reason the author considers this finding the earliest sign of thrombo-phlebitis.

It has been the experience of the author that the earlier treatment is established the better one can avoid complications. Likewise, early treatment will cause a much quicker resolution of the thrombo-phlebitis than if the condition is allowed to advance. As soon as this sign is elicited, the author elevates the extremities in a comfortable position on pillows, uses dry hot air several times daily to cause an erythema of the skin—in the interval using hot compresses of 30 per cent alcohol or subacetate of aluminum solution.

Thus, the author concludes, the detection of tenderness on plantar pressure is an early sign of thrombo-phlebitis, which can be elicited by routine examination daily. The value of this sign is in the prevention of complications by early treatment.

A. E. SOHMER, M.D.

THEELIN AND AMNIOTIN

The new preparations of ovarian hormone, such as Theelin and Amniotin, have been used in a large number of cases of troublesome menopausal symptoms, but the results obtained are by no means uniform. In many cases, no relief at all is obtained, whereas in others the benefit derived is excellent. In some cases in which good results are observed, part of the success may be attributed to the psychologic effect of the injections. (Jour. A. M. A., December 12, 1931, p. 1822.)

OBITUARY*(Continued from page 192)*

own specialty but also in the wider fields of medicine. He was not a great contributor to medical literature but was a keen observer, an excellent teacher. Ever tolerant of the opinions of others, his criticism was ever tempered with kindness and praise for the younger man and his work. With continued interest in educational matters during later years, his greatest joy was the education, progress, and success of his worthy son, recently made professor of physiology at Yale.

No greater tribute to the generous and humanitarian side of John Fulton can be written than the noble and unselfish service he rendered to the poor, by faithful daily attendance upon his clinic at the Wilder Dispensary of St. Paul during the last fifteen years of his life. In fact, his renewed interest and devotion to his profession, and his active participation in all medical societies during these years was an inspiring example for his young colleagues. Nature gifted him with a remarkable constitution and a strong will to overcome sometimes overwhelming obstacles. The younger generation could hardly think of John Fulton as one of the pioneers of medicine because of his alert mind, sustained enthusiasm, and energy right up to the time of his death.

Your committee is privileged to express its deep appreciation of John Farguahar Fulton, whose kindly nature we loved and admired, whose departure fills us with fond memory of valued friendship. We, the benefactors of his early work, admirers of his noble example and his sterling qualities, extend for the medical profession our sympathy to Mrs. Fulton and his son and daughters in their bereavement.

JUSTUS OHAGE, SR.

WM. DAVIS

J. T. CHRISTISON

FRANK E. BURCH, *Chairman.***Orville Whipple Parrott**

1863-1932

Mr. O. W. Parrott, Minneapolis, for fifty years active in the publishing business in the Twin Cities, passed away after a brief illness on February 13. Associated with the Bruce Publishing Company and its predecessors in the ownership of the publications of the Commercial Bulletin Company for the past forty-five years, Mr. Parrott had been production supervisor of some thirty-six monthly publications produced in the plant of the Bruce Publishing Company, one of which has been MINNESOTA MEDICINE.

It was the privilege of those associated with the publishing of the journal to know Mr. Parrott, and knowing him, even though it was only by occasional contact in connection with the publishing of the journal, was to appreciate the kindly qualities of a gentleman, always accommodating and an expert in his field.

BOOK REVIEWS

Books listed here become the property of the Ramsey and Hennepin County Medical libraries when reviewed. Members, however, are urged to write reviews of any or every recent book which may be of interest to physicians.

SURGICAL ERRORS AND SAFEGUARDS. Max Thorek, M.D. Surgeon-in-Chief, The American Hospital, Chicago, Attending Surgeon, Cook County Hospital, etc. 696 pages. Illus. Price, \$10.00. Philadelphia: J. B. Lippincott, 1932.

SURGICAL PATHOLOGY OF THE FEMALE GENERATIVE ORGANS. Arthur E. Hertzler, M.D. Surgeon to the Agnes Hertzler Memorial Hospital, Halstead, Kansas, etc. 346 pages. Illus. Price, \$5.00. Philadelphia: J. B. Lippincott, 1932.

THE STORY OF MEDICINE. Victor Robinson, M.D. Professor of History of Medicine, Temple University School of Medicine, Philadelphia. 527 pages. Price, \$5.00. New York: Albert and Charles Boni, 1931.

CANCER: WHAT EVERYONE SHOULD KNOW ABOUT IT. James A. Tobey, Dr.P.H., Fellow American Public Health Association, etc. 320 pages. Illus. Price, \$3.00. New York: Alfred A. Knopf, 1932.

PSYCHOLOGY AND PSYCHIATRY IN PEDIATRICS; THE PROBLEM. A Publication of the White House Conference. 146 pages. Price, \$1.50. New York: The Century Company, 1932.

BODY MECHANICS: EDUCATION AND PRACTICE. A Publication of the White House Conference. 166 pages. Illus. Price, \$1.50. New York: The Century Company, 1932.

THE PRINCIPAL NERVOUS PATHWAYS. Andrew Theodore Rasmussen, Ph.D. Professor of Neurology, Dept. of Anatomy, University of Minnesota Medical School, Minneapolis. 73 pages. Illus. New York: The MacMillan Company, 1932.

SYDNEY UNIVERSITY REPRINTS. Series IX. Medical Sciences (Non-Clinical). Illus. Sydney, Australia: The Australasian Medical Publishing Company, Ltd. 1928-1930.

KORYZA. Hermann Ernst. 104 pages. Illus. Vienna, Austria: Druck der Vernay A.-G., 1931.

PHYSICIANS' MANUAL OF BIRTH CONTROL: Antoinette F. Konikow. 245 pages. New York: Buchholz Publishing Co., 1931.

This is a volume of some 230 pages and there is no doubt that the author is very familiar with the use of birth control measures. She enumerates all the various methods in use and gives her opinion of their reliability, convenience and cost. She also gives her method of carrying out birth control measures; her reasons for doing so, and her reasons for not doing so in certain cases.

The third part of her book is devoted to various tables setting forth the various economic factors that

have a bearing on this subject and tables showing the various methods used and success obtained as well as the patients' comments. The author reviews the methods and statistics from foreign countries and gives her record of some 500 cases of her own. The book is a complete presentation of the subject.

A. G. SCHULZE, M.D.

A DOCTOR OF THE 1870'S AND 80'S. Wm. Allen Pusey, A.M., M.D., LL.D. 153 pages. Illus. Price \$3.00. Springfield, Ill.: Chas. C. Thomas, Publisher, 1931.

A delightfully written tribute written by a doctor son to his father, also a doctor, who belonged to the preceding generation and who represented the fine type of general practitioner.

The younger practitioner of today could read this volume with interest and would appreciate the hard-

ships of practice fifty years ago when horses and saddle bags were in vogue and bacteriology was unknown, but when the returns for practice were doubtless fully as satisfying as in our day.

C. B. DRAKE, M.D.

DIABETES DIRECTIONS FOR TREATMENT BY INSULIN AND DIET. Benjamin F. Smith, M.D., D. Appleton & Company, New York. 1930. Price, \$2.00.

Another volume for the diabetic patient. The brevity of its instructions recommends it. The great number of daily menus given facilitates the instructions given the patient. The method of substitution of combinations of food for those given in the diets in the reviewer's opinion complicates matters unnecessarily. There is no need for this or additional diabetic manuals.

C. B. DRAKE, M.D.

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